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VIEWS, NEWS AND INTERVIEWS.

The following paragraph recently appeared in the "Prominent People" column of the Chicago *Tribune*:

Miss Florence Wright, of New York, a guest at Woodbridge Hall, Saratoga Springs, will carry home with her a trophy of her season at the gay New York resort in the shape of a fox's tail. The brush was all that was left of the fox after the hunt, the only real fox hunt, by the way, that Saratoga resorters have indulged in this season, the balance of the animal having been crushed into a shapeless mass under the wheels of an electric car, whither Reynard had crawled for safety. The fox was a victim of the trolley system more than of the bloodthirstiness of the fair hunters.

A pretty and novel way of lighting a room was described to me the other day. Panels of frosted or delicately colored glass are inserted into the walls at different parts of the room, with a space behind for one or more incandescent electric lamps. The effect was said to be very pretty, having all the appearance of stained windows through which a warm glow of sunlight was diffused.—*London Lightning.*

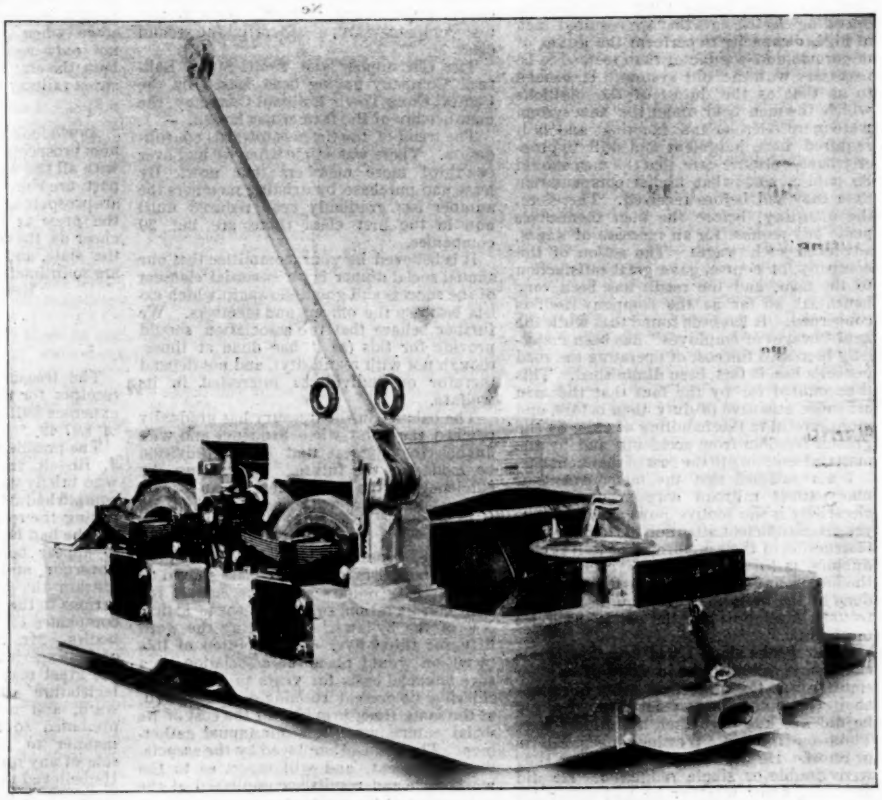
The favorite amusement of street loafers—whittling telegraph and electric light poles—has recently cost the Union Electric Company, of Seattle, $400 to $500. That sum has been spent in wrapping the poles with wire to protect them from the whittlers.

George Washington, the father of his country, was usually interested in public questions, and yet he is one of the few men who never expressed himself as for or against the trolley system.

The wife of a young electrician, well known in New York, has just returned home after a protracted sojourn in Buffalo, where natural gas is almost as much of a household necessity and convenience as running water. She has many stories to tell about the labor-saving uses to which natural gas, combined with electricity, is put. The one that interest her husband most is her description of an arrangement which she saw in the house of a Buffalo friend, whereby the master or mistress of the house can, upon awakening on a frosty morning, touch an electric button in the headboard of the bedstead and light the fires in the dressing-room, dining-room and kitchen. Another electric signal arouses the cook, and by the time that she reaches the kitchen she finds a hot fire awaiting her. The house meanwhile becomes comfortably warm while the members of the family are dressing.

General Electric Company's G. L. M. Locomotives.

The mining department of the General Electric Company has just brought out a new series of mining locomotives designated as the G. L. M. type. They are of an entirely new design from anything heretofore produced, and are arranged for operation in particularly low and narrow entries. In construction they are solid and substantial throughout, and embrace several new and desirable features. The frame consists of but a single heavy box-shaped casting with recesses in the sides for the axle boxes. Space is allowed at one end for the operating platform, and at the other end for the rheostat, the motor being placed in the center. Recesses are also provided in the frame casting for the brake levers and axle gears.



GENERAL ELECTRIC COMPANY'S G. L. M. LOCOMOTIVE.

The motor is of a type similar to the W. P. railway motor, and consists essentially of two main castings. The lower casting forms the lower pole piece, and supports the bearings for the armature shaft, the two intermediate shafts (placed one on each side of the armature) and the field spool. The gears are set in pockets in the frame of the motor, and are completely and tightly covered by the iron castings, thus doing away with the separate gear cases. The top pole piece is part of the upper casting of the motor, and is of such shape as to make a complete cover for the motor, thoroughly protecting the armature, field spool and other interior parts. The armature itself is of the iron clad ring type with all the latest improvements that have been shown advisable in railway practice. The intermediate shafts, two in number, are placed one on each side of the armature, and transmit power directly to both axles.

It will be seen that this construction offers the following very important advantages. First, by gearing the armature to two intermediate shafts on opposite sides, the thrusts of the gears tend to neutralize each other so that the resultant pressure on the armature bearings is very slight. Second, by doing away with the parallel connecting rods on the axles it is possible to largely decrease the width of the machine. Third, it allows a spring suspension for the whole machine, motor included, the advantages of which will be readily appreciated by everyone. Fourth, the axle boxes are on the outside of the machine and are easy of access for oiling, or for the removal and replacement of the linings.

The locomotive is equipped with a new form of trolley, perfectly insulated so that the operator may take hold of it at any part except at the wheel. In case it is necessary to move the trolley wire from one side of the entry to the other, the trolley may be lifted entire from its socket, and placed in a corresponding socket on the opposite side of the locomotive. All connections are automatically made by simply setting the trolley in place. The rheostat used is of the standard railway type provided with a special filling. The brake is a very powerful form of toggle joint made of substantial steel castings. Easy means are provided for the adjustment or renewal of the brake shoes.

All of the working parts of the locomotive are well covered and protected from injury.

The following are some of the general dimensions of the 30-6 and 30-10 locomotives as made for a 30-inch gage.

Draw-bar pull	3,000 lbs.
Speed	6 or 10 miles per hour.
Length over all	9 feet 6 inches.
Total height	36 inches.
Width over all	48 "
Wheel base	40 "
Gage	30 "
Diam. of wheels	28 "
Weight	15,000 lbs.

The same type of machine is made of different capacities, draw-bar pulls varying from 750 to 4,500 pounds.

TENTH ANNUAL MEETING OF THE STREET RAILWAY ASSOCIATION OF THE STATE OF NEW YORK.

PRESIDENT BECKLEY'S INTERESTING ANNUAL ADDRESS—REPORT OF THE EXECUTIVE COMMITTEE—THE SUPPLY MEN FORM AN AUXILIARY TO THE ASSOCIATION—ELECTRIC RAILWAY CONSTRUCTION DISCUSSED AT LENGTH—THE ASSOCIATION CONGRATULATES NEW YORK CITY ON THE ADOPTION OF THE TROLLEY—THE NEXT MEETING WILL BE HELD IN ROCHESTER.

President John N. Beckley, of Rochester, N. Y., called to order, at the United States Hotel, Saratoga, N. Y., on September 20, the tenth annual meeting of the Street Railway Association of the State of New York. Recognized delegates from the street railway companies of the state were present as follows:

John W. McNamara, president, Albany Railway, Albany; Daniel F. Lewis, president, Brooklyn City Railroad Co., Brooklyn; W. J. Richardson, secretary, Atlantic Avenue Railroad Co., Brooklyn; James A. Powers, superintendent, Glens Falls Electric Railway, Glens Falls; John N. Beckley, president, and Charles J. Bissell, counsel, Rochester Railway Co., Rochester; Charles Cleminshaw, president, and Charles H. Smith, superintendent, Troy and Lansingburgh Railroad Co., Troy.

The supply houses and engineering firms were represented by the following gentlemen: H. C. Evans, Johnson Co.; J. A. Hanna, McGuire Truck Co.; W. F. D. Crane, H. W. Johns Mfg. Co.; D. W. Pugh, John Stephenson Co.; W. J. Clark, A. Lewis and Prof. Peary, General Electric Co.; W. H. Delaney, Royaline Mfg. Co.; W. S. Silver, Graduated Car Spring Co.; F. D. Russell and E. Packer, Rochester Car Wheel Co.; C. S. Merrill, Engineering Equipment Co.; G. N. McKibben, Reed & McKibben; Elmer Morris, Thomson-Houston Electric Co.; J. E. Wallace, Smith & Wallace; A. R. Cook, Q. & C. Co.; J. F. Ostrom, Pennsylvania Steel Co.; Frank R. Ford, Short Electric Railway Co.; Willard S. Brown, American Casualty & Insurance Co.; John Patterson, Taylor Truck Co.; Frank A. Magee, The E. S. Greeley & Co.; J. H. Jones, West Troy, and Louis Pfingst, Boston.

President Beckley delivered his annual address, which was as follows:

ADDRESS OF PRESIDENT JOHN N. BECKLEY.

The Street Railway Association of the State of New York:

GENTLEMEN: The past year has been without special incident, so far as the street railroad interests of the state are concerned. I shall take your time but a few moments in giving a brief summary of the record of the year and calling your attention to a few practical matters.

Many members of the association feared that the street railroad interests would be subjected to uncalled for attacks on the part of the legislature at its late session, and much apprehension was felt that unjust and hostile legislation might be successful in impairing the value and usefulness of street railroad properties throughout the state. The Executive Commitee of this Association took early action looking to the protection of our common interests. The report of the work done by the committee in this regard, will, I am sure, meet your approval. The success which has attended the efforts put forth is evident to every member of the association. No bill striking street railroad interests, and no bill which injuriously affected street railroad interests,

became a law. The obligation of protecting the properties which are called upon to manage against adverse and iniquitous legislation is lost sight of. Certain of our brethern seem to reply upon the success of efforts which they trust will be put forth by others who, perhaps, have no larger interests to protect than have they.

The most important function of a state street railroad association is to furnish information to the members of the legislature as to the needs of street railroad companies, and to combat before legislative committees, and in personal intercourse with senators and assemblymen, the erroneous propositions which are often advanced without adequate knowledge of the condition of things. A great majority of the members of our legislature are honest men, who, when informed as to the facts, will act intelligently without injury to any legitimate industry or business. There always have been, and there always will be, others in every legislative body who take advantage of every opportunity which ingenuity can suggest to strike corporations by the medium of unjust and hostile legislation. Thus far the street railroad companies of the state have not been injured by unwise or dishonest legislation. But immunity cannot always be secured, except as the result of diligent and intelligent effort on the part of the street railroad companies themselves. A fair and intelligent presentation of the facts as they exist, made at the proper time, I believe, will always protect the interests with which we are identified; but such presentation ought to be made by the representative of this Association, and such representative ought to stand for every street railroad corporation in the state.

I trust the time will very soon come when every street railroad company in the commonwealth will not only have its name enrolled on the books of this Association, but will be as well an active, earnest and enthusiastic member. Our interests are common; our efforts should be united.

During the past year much progress has been made in the education of the people of the larger cities of the state upon the subject of the "trolley system" of propelling street cars. Even in the city of New York, where a year ago it seemed electric cars could never be operated because of the intense and unreasonable prejudice of the people, franchises are now being obtained, and there is every reason to believe that the old-fashioned, slow moving and nuisance-causing horse car system of that great and prosperous city will soon give place on all the lines to the modern systems of propulsion by electricity or cable.

Our Brooklyn friends have carried on their campaign of education with skill and unceasing effort, and the complete success of such effort seems now to be assured. So, throughout the state, until as error, ignorance and hostile interests are cleared away, the people of every community are coming to realize that they live in the last decade, and not in the middle of the nineteenth century. The improvements which have been made in electric and cable railroad appliances, machinery and construction, may be said to have kept pace with the demand for the same. The electric motor of to-day represents a great advance over the electric motor of last year, and the cable roads under construction in the city of New York represent the cable system at its best.

We shall have the pleasure and the honor to-day of listening to papers from two gentlemen, each of whom is in the front rank of his profession, and from them we shall learn what science, skill and experience have done in perfecting the two systems of street car propulsion, which are doing so much to make life the more worth living in the cities of our state.

Street railroad men are learning that in the management of our properties it pays to be liberal. I do not mean that it is wise to be extravagant, or reckless, or improvident in the management of such properties, but that a broad and progressive policy, which furnishes to the people increased facilities for travel, adds to the net income to be derived from the operation of street railroads. The public, as most of us have to come to know, are quick to appreciate improvements made, and as quick to respond with their nickels to the effort of a company to intelligently and efficiently serve them.

It seems to me wise, and in accordance with the best business principles, to keep a little in advance of the reasonable demands of the people with reference to improvements, additions and extensions. I do not mean that a company should heed the request or demand of 100 families to extend a line where it will require 1,000 families to support that line when extended. But constructing an extension somewhat, perhaps, in advance of the time when such an extension will pay operating expenses, is, in my opinion, as a rule, the wise thing for a railroad company to do. The same principle obtains as to the number of cars to be run on each line, and as to other improvements and betterments of the system. We depend upon the people for our patronage, and every street railroad man knows that a good feeling on the part of the people towards the company which serves them adds to the receipts of the line, makes it easier to obtain needed concessions from city governments as well as from individuals, and prevents the granting of franchises on parallel lines to competing companies where, perhaps, only one line can be made a commercial success.

While upon this subject of liberality of treatment on the part of railroad companies I desire to call your attention to the advisability, from a business standpoint, of adopting, whenever local conditions will warrant, a transfer system. It seems to railroad companies who now obtain two fares from passengers who desire to go from one part of the city to another by means of the cars on two lines, that the income of the company must necessarily be decreased if passengers are carried for a single fare of five cents.

After careful study of this whole question, we decided, at Rochester, to introduce a transfer system under which a passenger can ride from any point in that city reached by the lines of the Rochester Railway Company, to any other point reached by said lines for a single fare. We commenced giving transfers on this plan on October 5, last. We provided reasonable restrictions and necessary conditions. The experiment has proved an undoubted success, not only from the standpoint of the passengers, but from the point of view of the company as well. There is no question that the receipts of the company have been materially increased by the adoption and use of the transfer system. Perhaps the location of lines and other local conditions prevailing in other cities of the state may prevent the successful introduction of a transfer system. But I thought it might be of interest to members of the association to know of the pronounced financial success of the undertaking, so far as Rochester Railway Company is concerned.

Until March 1 the conductors and motormen of the Rochester Railway Company were paid the same wages as were formerly paid to conductors and drivers of horse cars. We very soon found after commencing operating electric cars that we required men of higher capacity to perform the duties of motorman and conductor than seemed to be necessary with the old system. It seemed to us that as the duties of the positions which the men held under the new system were more onerous and exacting, and as it required more judgment and skill to properly handle electric cars, that the men should be paid a somewhat higher compensation than they had before received. Therefore, the company, before the men themselves made any request for an increase of wages, advanced such wages. The action of the company, of course, gave great satisfaction to the men, and the result has been very beneficial, so far as the company itself is concerned. It has been found that while the item "wages of employés" has been materially increased the cost of operating the road per mile has, in fact, been diminished. This is accounted for by the fact that the men are more attentive to duty than before, and more careful in the handling of cars, by the greater freedom from accidents and by the material lessening in the cost of maintenance.

I am satisfied that the management of many street railroad corporations, where electricity is the motive power, have not as yet given sufficient attention to the thorough instruction of their motormen as well as conductors, as to the function of each part of the motor, and as to the proper thing to be done by the motorman and conductor when trouble develops while the car is in service on the line.

Some weeks since I had occasion, while riding on an electric car in a city of another state, to ask the motorman some questions about the motors he was running. I found he did not know whether the motors were Thomson-Houston, Westinghouse, Edison or Short. He did not know whether they were double or single reduction. He did not even know whether he had under his car body one or two motors. I asked him what he did in case he had any trouble on the line and he said, "If the motor don't work I wait until another car comes along and pushes me in." I found that this motorman had been for nearly nine months in regular service as motorman in that city. This motorman knew enough to turn on and turn off the current, and to set and loosen the brake. This, of course, is an extreme case, but it illustrates a principle. My own judgment is based upon some experience, that too much pains cannot be taken to thoroughly instruct the motorman, as well as the conductor, so that each will know the cause of trouble when trouble develops in either of the motors in service.

The plan the company with which I am connected has adopted, is to select from among the motormen one of the men who is pronounced by the master mechanic, the electrician and the superintendent, the best posted as to the construction and use of a motor, and make such man, for the time being, instructor of motormen on cars in actual service. The instructor rides with motorman after motorman, observes the manner in which he handles his car under all conditions and gives detailed instructions as to exactly what to do whenever trouble of the usual sort develops. The instructor spends from half a day to three days with each man until he pronounces him in every way qualified to run a car on every portion of the line, and to do that which needs to be done when trouble develops.

I might call your attention to many other matters of practical interest if occasion seemed to call for further statement. It is, perhaps, presuming in me to say what I have said, addressing as I am many who have had more experience than I. My only object in calling your attention to the matters I have referred to, is to make some suggestions which may be of value to some who have had less experience than I have, brief and limited though that experience may be.

The report of the Executive Committee was then read.

Report of Executive Committee.

SARATOGA SPRINGS, N. Y., SEPTEMBER 20, 1892.

To the Street Railway Association of the State of New York.

GENTLEMEN: Your Executive Committee respectfully submits the following report:

MEMBERSHIP.

At the last annual meeting of the association, the by-laws were amended so as to provide, by nominal fees, for the admission to membership of all operating street surface railway companies in the state. Pursuant to this action, two invitations were sent during the year to all street railway companies not members to join the association. The first was sent immediately after the annual meeting in connection with the circulation of the address of the president and the report of the special committee on Electric Motive Power for Street Surface Railways; the second invitation was sent later in the year accompanied with a printed copy of the annual report. As a result, five companies are members in the second class.

The Christopher and Tenth Street Railroad Company having been leased by the Central Cross-Town Railroad Company, the membership of the former has lapsed.

The trend of the times is towards consolidation. There was a time when we had over one-third more members than now. By lease and purchase by existing members the number has gradually been reduced until now in the first class there are but 20 companies.

It is believed by your committee that our annual social dinner is an essential element of the success and goodfellowship which exists between the officers and members. We further believe that the association should provide for this (as it has done at times, though not with regularity), and not depend therefor on individuals interested in its welfare.

The balance in the treasury has gradually reached the point when prudence and wise financiering suggest that ample provision be made for the future. Considering the efficiency of the association as an organization, and the work accomplished by it every year, especially before the legislature of the state, the judgment of the executive committee is that the annual dues of members in the first class should be fixed at fifty dollars; and we submit for your consideration an amendment to article XV of the by-laws, substituting the word fifty for thirty-five. The adoption of this provision would place the association on a sure financial basis for years to come, considering its present running expenses, and, at the same time, provide for the cost of its social entertainments at our annual gatherings. The counsel employed by the association is present, and will report as to the work done and results accomplished at the last session of the legislature.

SPECIAL REPORTS.

The money comes into the treasury of a street railway company in such very small sums and goes out in such correspondingly large amounts that it behooves us to see that the operating expenses are reduced to the lowest minimum. Inventive genius is ever active, especially with electrical devices, and whatever tends to increase the accommodation of passengers, improve the service, and, at the same time, reduce the cost, must necessarily be welcomed by us, for they are the declared objects for which the association was organized.

Two special reports were, therefore, provided for on subjects of vital concern to the street railway business. The titles are, "Recent Improvements in Cable Traction" and Recent Improvements in Electric Traction;" both subjects to be treated by men than whom none are better able to prepare papers thereon.

Cable power has been with us for some time, but on a small scale, comparatively, with the systems which it was believed would be in operation before this meeting. The undertaking both on Broadway and Third avenue lines has been so extensive that it has been impossible to get the roads in operation. Much, therefore, that would have tended to make the report on the first subject of unusual interest has been denied the committee; so that the request has quite recently been made that the presentation of this report be deferred until the next annual meeting.

Electricity has been booming in this state since we last met. Brooklyn, fortunately for its citizens, will soon be blessed with the overhead system on a scale no where equalled in the world; the very best construction both for track and overhead work having been adopted throughout the city. When fully developed to successful operation in that city, the system will bring about the condition of things throughout the country by the substitution of electricity for horses, set forth in the advertisement of a famous patent medicine, of which it is declared the "children cry for it."

Already some of the leading dailies of New York city are beginning to change their hitherto insane abuse of the so-called "deadly trolley," that has never yet killed even one human being; and they will soon be tumbling over one another in their enthusiastic advocacy of a system regarding which they have finally decided to learn something; and no longer to depend upon their imagination for their facts.

Whatever recent improvements with manifest merit have been made in the electric system, will be hailed with delight by those interested in this form of motive power.

COMMUNITY OF INTEREST.

For the first time in several years there has been no "strike" on any surface street railway in the state. In the light of the year's experience, the report of your committee at the last meeting is prophetic, for the time has indeed come, of which that committee said, "all matters of difference which may, and inevitably must, from time to time, arise between employer and employé, will be adjusted amicably by the parties interested." The time has at last come when their community of interest is not only recognized, but appreciated, by both the employer and the employed in the street railway business.

THE OUTLOOK.

As we look out upon the future, our business prospects were never better. At peace with all the world, our people, for the most part, are contented and happy, because they are prosperous, and with the enlightenment of the press as to the new motive power to cheer us, the outlook is good for the nation, the state, and the business with which we are so intimately associated.

Respectfully submitted,

DANIEL F. LEWIS,
JOHN N. BECKLEY,
CHAS. CLEMINSHAW,
Executive Committee.

The treasurer's report showed that the receipts for the year were $945.66 and the expenses $918.17 leaving a balance on hand of $27.49.

The president then introduced Mr. Charles J. Bissell, the counsel of the association, who briefly stated the work that had been accomplished at the state legislature, at Albany, during the recent session. Mr. Bissell said that he had been retained by the association to appear before the committees and the governor, and by argument and reason to restrain the enactment of legislation injurious to the interests of the street railway companies of the state and other corporate bodies. Mr. Bissell stated that the result of his experience was that he believed that the great majority of the members of the legislature were honest and straightforward, and needed only to have matters presented to them in a logical and open manner to properly appreciate the right side of any question, and vote accordingly. He believed that there was but a very small minority in either house whose votes could be influenced by any other means.

Mr. McNamara, of Albany, followed with a statement to the same effect which was seconded by Mr. Powers, of Glens Falls, as also Mr. W. J. Clark, of the General Electric Company; the latter statement referring to the legislature of Ohio.

Mr. Lewis then called attention to the fact that much more effective work could be done in this direction if the smaller companies in the state could be brought into membership in the association, dues in such cases to be merely nominal; and suggested that the supply men present could be instrumental in bringing the matter of joining the association before the smaller companies in the state in the course of their business calls upon them.

Mr. Ostrom, of the Pennsylvania Steel Company, on behalf of the supply men present, said that he believed that he could say that they would be willing to use their best endeavors in this direction. This was endorsed by Mr. W. J. Clark. The result was that during a brief recess of the association a meeting of the supply men was held, of which Major Evans was chairman, and a

committee appointed to report measures for the formation of an auxiliary to the association to secure this end. The committee consisted of Messrs. Ostrom, Clark and McGraw.

Later in the day another meeting was held and a permanent organization effected, of which the following gentlemen were elected officers: W. J. Clark, president; John W. Fowler, first vice-president; D. W. Pugh, second vice-president; John H. Jones, third vice-president; Edward H. Gilbert, fourth vice-president; Clarence E. Stump, secretary; executive committee, W. J. Clark, C. E. Stump, H. C. Evans, T. C. Martin, John A. Wood, W. S. Silver, F. D. Russell, S. W. Baldwin and D. A. Breckenridge.

Following the remarks of Mr. Bissell, the next business was the report of the committee on "Recent Improvements in Electric Traction."

The report was read by Mr. McIntire, as follows:

Report of Committee on Recent Improvements in Electric Traction.

SARATOGA SPRINGS, N. Y., September 20, 1892.

The Street Railway Association of the State of New York.

GENTLEMEN: We understand that anything which tends to an increase of reliability or economy of operation of an electric railway is an improvement; and it is with the intention of bringing before you in a brief manner the results of my experience and observation during the past year upon these points that this article has been written.

As you, of course, know, electric systems as first constructed were built on altogether too light a plan, and the increasing tendency year by year has been, and is, for heavier and more solid construction in every department, but particularly in the way of track and station equipments. It has been well said that no new departure is ever perfect at the beginning, and no one realizes this more than he who has watched the development of electric traction during the last few years.

The storage battery has made but little progress during the past year, and is not likely to cut much of a figure in electric traction until it is able to make a better showing, financially, than it has in the past.

It may seem strange that the management of roads, even at present operated by horses, cannot see that a change of some kind must come soon owing to the great cry for rapid transit; and yet I know of roads at present being laid with flat center-bearing rails on stringers in streets being newly paved. I do not mention this as an "improvement," but simply to show that what may be regarded as an improvement by some would be called simply a makeshift or temporary piece of work by others.

The general tendency of the times to consolidate all common interests under one management is showing its effects in electric traction more now than ever, and scarcely a week passes that we do not hear of some syndicate obtaining control of some horse road, and the information usually ends with the statement that "it is intended to equip all the lines with electricity." From many points of view this is an improvement and a marked one.

TRACK.

The improvement in track construction has been very great, and although many expensive errors have been made, we ought, on the whole, to feel satisfied with the progress.

The early forms of track construction were too light and soon went to pieces; but during the past year heavier rails have been rolled and better joint plates made, so that it is possible to keep the roadbed in perfect line and surface. This improvement has been a great help to the electric equipment and has reduced the cost of maintenance. As the cost of laying tracks is about the same, whether light or heavy, it is economy to put in only the best.

Now, on the question of what constitutes the best form of track, there is considerable variance of opinion. My experience and observation has convinced me that the deep girder rail, about nine inches high, spiked directly to the ties, is the best form for paved streets, and in dirt or macadam streets, a six inch girder rail laid in the same manner. In the country and where the local authorities are willing, I would lay a T rail, spiked directly to the ties.

The weakest place in all forms of track construction is at the joint. Every manufacturer of rails, and many of the railroad companies, have tried to overcome this trouble. There are probably as many patents upon rail joints as upon car couplers, and most of them about as impracticable. Up to the present time there has been nothing brought out which surpasses a properly designed "fish-plate."

While speaking of track construction, it might be well to call attention to the bonding of rails for the return circuit. Many forms have been used, and some of them are still in operation. I believe that a No. 0 copper bond wire long enough to connect with the web of the rail on each end of the fish-plate is the best plan, and then grounding the whole system at frequent intervals, and abandon the supplementary wire which it has been the custom to use with the common form of bonding.

ELECTRIC EQUIPMENT.

Probably the greatest advance in any particular line has been in the matter of armatures for motors and dynamos. I consider that the introduction of the "iron clad" type will do more towards reducing the bill for repairs in that direction than any other one thing that has been introduced during the year. The electric companies have all, I believe, now adopted this form as their standard, and all roads that have tried them will, I think, agree with me that, for simplicity, ease of repair and ability to stand the hard usage they receive, they stand at the head.

In the manner of controlling the motors most of the companies still use the time-honored rheostat; although I believe one company is endeavoring to introduce a new type of controller, which they will, doubtless, be happy to explain at a later date.

Many roads, acting under a misapprehension of the requirements, started off with motors too small for the work, and endless trouble has been the result. Some new classification should be adopted by the electrical companies for designating the power of their motors, as the present "office classification" does not afford a proper understanding of its capacity, and the "horse-power" term is but little better, depending on so many limiting conditions. A more satisfactory way would be to specify the number of pounds the motor can pull at different speeds, with the maximum current for which it is designed.

TRUCKS.

The first car trucks employed in electrical work were of the pedestal form; that is, the trucks were fastened to the car body and oscillated with the car. The motors, of course, had to be suspended from the car body, and the result was that the grinding of the gears was transmitted through the whole car; also, the oscillation of the car body caused the motors to correspondingly rise and fall. This was very undesirable, and it was soon found necessary to adopt the post form, in which the truck was complete in itself and the motors supported directly on the frame of the truck. The body was connected with the truck only by springs, thus being entirely free from the jolts and pounding of the truck.

In this form slight spiral springs were first used, the same as in the previous styles, but it was soon found that the high speed attained caused the body to oscillate to such a degree that it became very objectionable, and the different builders then modified their trucks by extending the side bars beyond the axle boxes a sufficient distance to allow an auxiliary spring to be added at each end. For this auxiliary support, coil and elliptical springs have been used, both forms with marked success, and it is now possible to carry a car body 28 feet over all, practically without oscillation. This last modification has been a very great improvement, and has settled the long car question on most street railways. I mean by this that but very few double truck cars will be used, though, of course, there are places where two trucks can be used to advantage, and in such places they will still be employed. But where we are able to carry nearly as many people on four wheels as on eight, and to apply the power equally on each axle, so that there is no possibility of lack of traction, there can be no gain to the railroad company in using eight wheels.

CARS.

The car bodies first employed were of the same style and proportions as those used for horse roads, and were not properly designed for electrical purposes; first, the framing of the roof was too weak and would not support the trolley board properly; second, the framing of the floor was not adapted for the use to which the cars were put; for not only was the framing too weak, but it also was not well planned for putting in the trap doors which are required in order to inspect the machinery underneath the floor.

The car which it seems to me is best adapted for the present service is one 18 feet six inches long inside, with platforms three feet six inches long. The rafters should be strengthened with steel plates and the framing throughout should be heavier.

The coloring of the cars and the necessary signs are attracting considerable attention from the different railway companies, but up to the present time I do not think any concerted action has been taken. For my part, I believe that all of the cars on a system should be painted the same color; that is to say, each separate line should not have a distinct color, but signs should be used to designate the different routes; preferably by means of the well known reversible sign on the top of the car both at the sides and front. At night the lines might be distinguished by the color of the ventilator glass, which would in each case be the same as the ground color of the reversible sign.

OVERHEAD CONSTRUCTION.

There has been a general improvement in all parts of the overhead material. We are using stiffer poles, stronger span wires, better trolley wire insulators and handsomer curve fittings; so that the general appearance of the system is much pleasanter. The quality of insulation now in general use is far superior to what we had two years ago, and as double insulation is now employed on the span wires, very little trouble from leakage is experienced.

The method of feeding the line is a very important matter and should receive careful attention. The best arrangement is to divide the system into several sections, so that in case of trouble along any portion of the line, such as fire, etc., that section can be cut out and the balance of the system run as usual.

THE POWER STATION.

This may be rightly called the heart of any electric system. The trolley and feeder wires form the arteries, the rails and return wires the veins, and the cars the capillaries connecting them. The Biblical injunction to "Guard thy heart with all diligence, for out of it are the issues of life," would certainly seem applicable to the station. The chief element to be considered should be reliability, and, after that, economy. Just what means shall be used to attain this end seems so far to have been a disputed matter, as shown by the stations now in operation, which contain almost every conceivable device, good, bad and indifferent; all shapes, sizes and descriptions of engines, boilers and dynamos. Many designers of stations—if some of them can be said to have been designed at all—seem to have gone at their task utterly regardless of the future and oblivious to the experiences of the past. However, through it all I can say that a very marked improvement is observable lately. The designers of stations are learning wisdom from their past experiences, and the makers of apparatus are more alive to the requirements of the system, and better material and workmanship can be had where required.

The recent introduction of large multipolar dynamos has brought about a change in station arrangements not heretofore obtainable, and in all large stations now being built countershafting is dispensed with entirely, and the general tendency is towards reduction of parts, which in turn means simplicity. It is very probable that we have reached now a form of station that will be fairly permanent, and the main point in the future will be the size of the units. For medium size stations engines with releasing valve gear belted direct to a multipolar dynamo will be the best where the price of land is not excessive, and direct coupled engines and dynamos for larger stations. To my knowledge there have been no comparative tests made as to the economy of the various types of stations, although all reasoning would point to these latest types as being by far the most economical.

There has been heretofore too much taken for granted or assumed in electrical work, and the rapid growth of the business has called into it many who were totally unqualified for the positions which they obtained. I attribute much of the unsatisfactory work in the past to this course, but am happy to note that the great majority of these are passing into the background, and their places are being filled with men of good judgment and mechanical resources.

Respectfully submitted,

L. H. MCINTIRE, *Committee.*

At the conclusion of the reading of the report, Mr. Lewis offered the following resolution:

Whereas, The Street Railway Association of the State of New York, assembled at Saratoga Springs, for its tenth annual meeting, has learned that the Union Railway Company, of New York, has put in operation this week the first electric trolley cars within the city of New York.

Resolved, That the Association congratulates the company and the public of the greatest city in the Union upon this adoption of the latest and most improved method of street railway traction;

Resolved, That this Association earnestly deprecates the opposition manifested against the trolley system in various quarters, as being founded upon neither reason nor fact, and as being contrary to the best interests of any community seeking rapid transit facilities and suburban homes for a growing population;

Resolved, That the Association hereby tenders to Mr. L. H. McIntire, engineer of the Union Company, its thanks for his able address on the work already accomplished in New York, and its wishes for the development in the metropolis of the system thus inaugurated.

The resolution was adopted.

The president then announced the report on electric traction to be open for discussion.

Mr. McNamara: Mr. McIntire failed to tell us if anybody has tried the deep girder rail which he refers to and found it any better than the system which he recommended to us a year ago. We are using the ordinary tram rail; and I still hope that we are right and he is wrong. As to the large generators, it is very comforting to know that you have got a machine that is capable of delivering a large amount of power; but if it breaks down, what then? Your large unit is taken out of service, and unless you have a correspondingly large unit to take its place, you are left without power. It is a question for us whether it is desirable to increase the size of the units, and if so, what should be the limit. Of course, I take it that the limit is only reached when you are enabled to duplicate the unit; because no one would attempt to operate a railroad, electric or otherwise, unless he were able to operate it continuously; so that if one of your large units fall, you must have another to take its place.

Mr. Beckley: In other words, the expression is relative. What would be a large unit for the Rochester Railway Company, would be a small unit for the Brooklyn City Railroad Company.

Mr. McNamara: Yes, that is it. We have found in Albany that we have worked very successfully with small generators. We have had more than ordinary success, as it seems to me, in operating small generators. Our success has been so great that it was not until a week ago that we lost our first armature running nine or ten machines. We discovered a defect in the armature which compelled us to take it out. Lightning has been in the station numerous times, but we have escaped its destructive influences, and it has been safely carried to the ground. As to the painting of cars, we have them all one color; and the question is how to designate by colors the lines upon which they are to be operated, because every person who runs is not able to read. We have so far designated our lines by dash signs, painted the same color as the cars were when operated by horses.

Mr. Beckley: What do you do at night?

Mr. McNamara: That is the point where the difficulty lies. The headlights usually preclude the possibility of giving sufficient notice in advance of what line the car runs on—so that when you exhaust the primary colors of red, blue, white, green and yellow, you have come to the end of it. Most people cannot distinguish between shades of colors.

Mr. McIntire: The form of girder rail I refer to is laid on fifteen miles of road, in the northern part of New York. It weighs 70 pounds per yard and is laid upon yellow pine stringers, 5x5. The rails are spiked directly to the stringers, which rest upon cross ties. I use a joint plate 26 inches long, bolted with six bolts; and the joint plates fit the taper under the head and at the bottom of the rail, so that as we pull the plate in it wedges and tightens. At the joint, which is the weakest place, I put a tie directly under the rail joint, and one under where the timbers joint; the balance of the ties are spaced 36 inches on centers. I also use an additional tie, three feet long under each end of the fish-plate, so that the rail joint is supported by three ties. Every tie is tamped perfectly. That gives us a direct support joint. If it should come down, we have the suspended joint by means of the support from the ties at the end of the fish-plate.

Mr. Lewis: Do you advocate an absolutely rigid joint?

Mr. McIntire: Yes, in paving. There is nothing else that you can put there that will stand; you can make it of iron or T rail, or use any of the devices that have been brought out, and it will go down if the joint is open and the wheels are allowed to pound. The rail men will immediately inquire, what will you do if expansion takes place? Now, if you lay a center bearing or tram rail in this manner, you get into trouble because it is exposed to the sun and expansion will take place; but with a deep girder rail down in the earth the heat is radiated, and you do not have that trouble.

Mr. Lewis: Do you put your rails close together?

Mr. McIntire: Yes, solid together.

Mr. Beckley: Did you pass through last summer with this road?

Mr. McIntire: Yes, sir.

Mr. Cleminshaw: Is that the road you built in New York?

Mr. McIntire: Yes, sir.

Mr. Cleminshaw: Then you have not given it a test with an electric system, except during the last week?

Mr. McIntire: That is all.

Mr. Cleminshaw: That settles the question.

Mr. McIntire: The trucking on Third avenue is equal to any wear on the track which will be given it by electric motors.

Mr. Cleminshaw: There is nothing known in traction that compares with the pound on the track which is given by an electric motor. What might be all right in the case of a horse road, with very heavy trucking, experience has told us that nothing yet compares with the pounding of the motor on the rail.

Mr. McNamara: I have seen some of this 70 pound rail that was laid last year, on a road operated by horses, and it has got a pound at every joint, that you can hear.

Mr. McIntire: It was not constructed properly. If you will lay your track and put your rails solidly together, and bring

the joint plates home with the bolts, and properly tamp as it is drawn up, and see that it is supported properly, you will have a good track. As to dynamos, I have not seen any that begin to compare with the new type of iron clad armature multipolar dynamos, and I cannot see why we should have any trouble with them. Of course, if something happens to the engine, you must have a relay.

Mr. Powers: To my mind the first question that presented itself in this matter of electric roads and tracks was the problem of the joints. The steam railroads have solved this problem to their satisfaction, perhaps not altogether, but practically so, so that you cannot count the joints as you ride over the best tracks. They have solved it on a totally different principle from that generally shown in the types of joint which I have been accustomed to see on street railway tracks. The general idea of the steam railroad man is to make his rail continuous, and then the question of supporting the joint becomes one of secondary consideration. If we could roll the rail continuous and have no joints, the track would be perfect; but the ordinary joint for street railroad tracks and electric railway tracks has been merely something for keeping the ends of the rails from spreading apart vertically. I had a liberal education on this question in about five minutes at Poughkeepsie. I looked at the joint which the New York Central road put on its tracks. They had an angle bar as heavy as could be taken in between the head and sole of the rail; it was about 40 inches long, four bolts near the joint holding it firmly from having any up and down motion, with two bolts at the extreme ends. The bolts seemed to be larger than those generally used. I believe that is their standard system now, and there is no difficulty about holding your rail if you will put simply the ordinary amount of support under the track. We adopted this form on our road at Glens Falls, using a very light rail, 40 pounds, and if anyone can count the joints on our road I should be glad to have him do it.

Mr. Lewis: Do you notice any declension in the joints?

Mr. Powers: They are absolutely smooth, and the matter is well worth your consideration. It seemed to me that after all the experience the steam railroad people have gone through, and the enormous weight they get on a single pair of driving wheels, the fact that they have solved the problem to their satisfaction should be of value to us; while most of the so-called joints in the street railway business have been formerly tried on steam roads and are not satisfactory. It is no uncommon thing to find a new piece of electric track going to pieces in a short time. One reason is the sparseness with which the ties are apt to be put in. We put them in less than two feet apart centers, less than 16 inches at the joints. We stagger the rail joints.

The headlight question is very important. We run very fast, averaging 10 miles an hour, including stops, sometimes reaching 18 miles an hour. I find in looking about among the electric railroads that the headlight is usually one of the easiest things to be neglected; mirrors soiled, burners old and the light dim, and you might as well not have any. They should cast a good reflection, so that any obstruction on the road, such as a drunken man or carriage, may be seen and the car stopped before reaching the place.

Mr. Lewis: Where do you locate your lights?

Mr. Powers: On the dash. We have adopted a 32 candle lamp. It adds to the appearance of the car to have this brilliant light and it costs but a trifle more.

Mr. Cleminshaw: Any one who runs an electric road six months knows that there is nothing as important as this matter of joints. The Troy road has spent a good deal of money in that direction. Mr. Powers' statement may mislead somebody as to the joints on his road, and one sentence will explain the whole matter—he runs a single track road. That is all there is in it. We have a road where we run both ways, and it is one of the smoothest roads anywhere. The pounding is in both directions.

Mr. Powers: The steam roads do not run both ways.

Mr. Cleminshaw: No, that is true; but they can screw up the nuts at the joints. We cannot do that in a street road, as they are under the ground. There is not an electric road in existence to-day that has run one year that has got a perfect joint. We built a road about 15 months ago, 63 pound rail, new pavement, new ties 30 inches apart, and everything first-class. It ran six months very well, but to-day it is going, going. There is no remedy. We have come the nearest to it with a suspended joint. The theory is taken from the steam railroad practice. We have so far had no trouble with these joints; but it may come.

Mr. McNamara: We have had some experience with headlights, and we have concluded that the place for the headlight is on the hood, for several reasons. The first is from an economic point of view. If you have it on the dash it is going to be broken. You are going to have cars on the line that will have a slight brush with some vehicle, and while your car may be uninjured, you will be minus your headlight.

Mr. Powers: Cannot you make the frame stronger?

Mr. McNamara: We are liable to have these accidents all the time; and the headlight is the first thing to go, if you have it on the dash. We do not break any headlights on the hood, and our motor drivers all say they get better results; and we know that people who are to be warned, are better warned with a light on the hood than with one on the dash. We have had experience in accident cases and have been able to demonstrate that our headlights are visible at a distance of 1,000 feet, plainly showing the car and surrounding objects. I doubt if a light on the dash would be so effective. Of course, unless the color light, showing the line on which the car runs, is very strong, if placed at the front of the car, it is apt to be counteracted by the headlight. We have tried using a headlight with a rim of colored glass around it; in this case, red. We had a rim about an inch wide. It was distinguishable at 40 feet away, but at 100 feet away it was not distinguishable.

Mr. Powers: There is one condition which has occurred to me and which strikes me as important in regard to the headlight on the hood; you avoid the possibility of the headlight being obscured by a wagon or other vehicle.

Mr. Beckley: I want to say a word or two on the question of the color of cars. We have in Rochester 11 different lines of cars in operation, and it would be quite a serious matter for us to maintain the necessary equipment to have the cars of different colors, and each color devoted to a particular line. So far as the daytime is concerned, we have the problem solved to our satisfaction. We have the plan adopted by the elevated railroad in New York, of employing two disks. These disks are put on the hood of the car, set in a socket, so that we can take one color of disks off and put in another. After we have exhausted the five chief colors, red, green, blue, yellow and white, we simply combine the colors. Of course, we have signs on the cars for the benefit of those people who can read, but the people who travel on the cars very soon learn to depend on the coloring rather than the lettering. Our signs and disks, by reason of the socket arrangement, can be very easily exchanged, one line for another. We do not have the reversible sign. We get along all right in the day time; but we must go a little further and get a light that can be seen 1,000 feet away. We propose to use large bull's eyes at night, making similar combinations of color as on the disks in the day time.

Mr. Cleminshaw: We are having cars made now with bull's eyes four times as large as usual.

The discussion was then closed.

Mr. George McNulty, engineer of the Broadway Railroad, New York, was to have prepared a report on "Recent Improvements in Cable Traction," but owing to the fact that it had not been possible to get the road in operation before the time of the meeting, as was expected, he requested that the report be deferred until the next meeting. The request was granted.

Messrs. Cleminshaw, Lewis and McNamara were appointed a Committee on Nominations, and they proposed the following names, and the gentlemen were thereupon elected: President, C. Densmore Wyman, New York; vice-president, Daniel B. Hasbrouck; New York; second vice-president, James A. Powers, Glens Falls; secretary and treasurer, W. J. Richardson, Brooklyn. Executive Committee: D. F. Lewis, Brooklyn; John N. Beckley, Rochester; John W. McNamara, Albany.

Mr. Lewis offered an amendment to the by-laws, increasing the annual dues of members in the first class to $50, as recommended by the Executive Committee, which was adopted.

The meeting then adjourned, to meet in Rochester, the third Tuesday in September, 1893.

In the afternoon all in attendance at the meeting were invited by the Union Railway Company, of Saratoga, to participate in a trip on the electric road to Saratoga Lake. The ride was enjoyed by all.

In accordance with a suggestion made in the Convention that a Material Men's Auxiliary Association should be formed, the material men present met on the United States Hotel piazza at 1.45 P. M.

On motion, H. C. Evans acted as chairman and appointed John F. Ostrom, W. J. Clark and J. H. McGraw a committee to report organization and name and to name officers for the ensuing year.

After a trip over the line of the Union Railway Company, of Saratoga, the material men met in Parlor 8, United States Hotel, at 5.00 P. M. and received the committee's report as follows:

The name of this organization shall be "Association of Dealers in Street Railway Materials, of the State of New York."

The object of the Association shall be to make possible concerted action on any matters that may affect the business of its members and to aid the New York State Street Railway Association in its efforts to prevent any legislation which it may consider hostile to the interests of the street railways of the State of New York, as well as to aid it in promoting beneficial legislation.

The officers of the Association shall be a president, two or more vice-presidents and a secretary and treasurer, to be elected annually.

The work of the Association shall be performed by the officers and committees as follows:

A.—An Executive Committee of nine members, to be elected annually.

B.—A Legislative Committee of five members, to be appointed by the president annually.

The dues of the Association shall be: Initiation fee, $5; annual dues, $5.

This Association shall hold an annual meeting on the date and at the place of the annual meeting of the New York State Street Railway Association, and other meetings at such time and place as may be called for by the president.

MEMBERSHIP.

Any individual, firm or corporation, dealing in street railway materials, any engineer, individual, firm or corporation engaged in street railway construction work or any trade paper published in the interest of the street railway profession, may become a member by registering with the secretary and treasurer and paying the initiation fee and annual dues.

Each member to carry one vote.

Your committee would suggest the following as officers and committee to serve for the ensuing year: President, Wm. J. Clark, New York; vice-presidents, Jno. W. Fowler, Brooklyn, D. W. Pugh, N. Y., John Jones, Troy, N. J. Gilbert, Troy; secretary and treasurer, C. E. Stump, N. Y.; executive committee, W. J. Clark, N. Y., H. C. Evans, N. Y., Jno. A. Wood, N. Y., Wm. S. Silver, N. Y., C. E. Stump, N. Y., T. C. Martin, N. Y., S. W. Baldwin, F. D. Russell, Rochester, D. C. Breckenridge, N. Y.

It would also suggest that the president be authorized to appoint a committee to perfect a constitution and by-laws as embodied in the above.

Respectfully submitted,

(Signed.) JOHN F. OSTROM, Chairman.

After some discussion, the report of the committee was adopted and the officers declared elected. It was decided that only residents of New York State be eligible as officers or committeemen and that the constitution contain such a provision. It was also resolved that the president be appointed a committee of one to advise with the New York State Street Railway Association and advise it of the action of the meeting.

GENERAL NOTES.

The Eastern Electrical Supply Company, manufacturers of electric supplies, 147 Milk street, Boston, who recently assigned to Ira C. Hersey, owe about $19,000, with nominal assets of about $22,000.

Dennis Sullivan, the superintendent of the Coney Island and Brooklyn Electric Railroad, was shot and probably mortally wounded the afternoon of September 20, by Frank Gateley, an electrical mechanic employed on the road. The shooting took place in front of the depot, at Smith and Ninth streets, Brooklyn. It is supposed that Gateley attempted to kill the superintendent in revenge for supposed harsh treatment on the part of the latter.

In Common Pleas Court, No. 4, at Philadelphia, last week, a bill in equity was filed by the Third National Bank against the Electric Power Company, the Philadelphia Illuminating Company and the Solicitors' Loan and Trust Company. A representative of Theodore F. Jenkins, counsel for the bank, stated that the bill was brought to foreclose a mortgage on the property of the power company. Continuing, he said that the power company's place of business was on a small street running off of Thirteenth street, below Market. That the power company had issued bonds on its property, secured a mortgage, and had given the Third National Bank $50,000 of these bonds in return for a loan of $10,000, and that the bank was attempting to procure payment of this loan by foreclosing the mortgage.

ELECTRIC LIGHT FLASHES.

Elmore, O., wants to be lighted by electricity.

Anderson, Ind., will soon own her own electric plant.

Batavia, N. Y., would like to establish a municipal electric light plant.

The plant of the Bucksport, Me., Electric Light Company has been sold to Mr. C. H. Rice of that town for $16,000.

Nashua, N. H., has decided to have all-night electric lights, and has made a four years contract for them at $112 per light.

The celebrated high electric light mast at Minneapolis, which is 257 feet high, has proved ineffective for lighting purposes, and is now no longer used.

The Kelly's Falls, N. H., Electric Company is to enlarge its plant by a brick addition 80x35 feet. The addition will be two stories in height at the back.

Henry Keller has sold his electric plant at Sauk Centre, Minn., to S. D. Davidson, who will run the same in connection with his mill. Consideration, $12,000.

Lancaster, Pa., will have another electric light plant using the Westinghouse system, with an authorized capital of $100,000, one-half of which has already been subscribed.

Detroit was partially in darkness last week owing to a strike of 24 lamp trimmers employed by the Detroit Electric Light and Power Company. The strikers cut the circuits in many places.

Braintree, Mass., has about completed its new electric light plant, it being the first town in the State which has the distinction of putting in the first plant under the new law of municipal lighting.

Stockholders of the Edison Electric Light Company, of Philadelphia, are said to have asked the directors to pay them 10 per cent. per annum cash, or 10 per cent. in stock against earnings applied to construction.

The contract for lighting the streets of Hackensack, N. J., will be awarded in a short time. The Improvement Commission promise that the general condition of the work will be better than during the past year.

At a meeting of the directors of the Amesbury, Mass., Electric Light Company, held September 16, it was voted to pay a quarterly dividend of one per cent. to all stockholders on the books October 1, 1892. The dividend will be payable on or after October 15, 1892.

Salamanca, N. Y., expects to have electric light by November 1. William O'Brien has broken ground next his house on River street for a brick building 30x50 feet. He will put in an engine of 100 horse-power, and dynamos which will furnish 60 arc and 900 incandescent lights.

According to Butte, Mont., papers the plant of the Butte Electric Light Company is to be sold to a St. Paul and Boston company for $225,000, if negotiations now under way are successful. The purchasers are said to be Thomson-Houston people. The company has done a business of about $13,000 per month, which is increasing.

The Municipal Gas Company, which operates in Albany and West Troy, N. Y., recently absorbed the electric light company in Albany. It then submitted for filing with the Secretary of State a certificate of an extension of its business, under Section 32 of the stock corporation law, as amended by Chapter 688 of the Laws of 1892, so as to include the business of electric lighting. The Secretary of State refused to file the certificate, on the ground that a certificate of incorporation of a company should contain only such business objects as are authorized under Section 60 of the Transportation Corporation law; and further, that a corporation could not be organized under Section 60 with objects of furnishing both gas and electric lighting. This refusal has resulted in Marcus T. Hun serving the Secretary of State with an order to show cause before Judge Fursman, on September 26, why such certificate should not be filed.

MEDICAL ELECTRICITY.

EDITED BY DR. J. MOUNT BLEYER, NEW YORK.

The Human Body as a Conductor of Electricity.*

This question has again been brought up before the last session of the British Association, at Edinburgh, by H. Newman Lawrence, M. I. E. E. He said that the human body is no ordinary conductor; this has been long ago acknowledged, but the peculiarity of its conductivity and the conditions under which this conductivity varies are subjects which have hardly yet been satisfactorily investigated. Much has been done to determine the true resistance† of the living body, and a near approach to the solution of the problem has been arrived at, but the difficulty of the relative value of the resistance of the skin and the internal portions of the body still remains. Erb has shown how much greater still is the difficulty, because the skin and the different parts of the body differs in its conducting power, even after contact area and surface soakage have done all that is possible for them in the way of equalizing matters. He says that a knowledge of the distribution of conductivity, and how each particular section acts to the passage of current after the initial resistance has been overcome, is of scarcely less importance in connection with accidental contact than that of initial resistance itself.

The author of this paper wrote a communication to this Association, in collaboration with Dr. Harris, wherein he dealt at some length with the resistance of the body to different forms of current. Since then he has made other observations, and though these are still incomplete, he has embodied some of them in this present paper in the hope of bringing out a criticism, and thereby a satisfactory solution of the question before us.

This experimenter has endeavored to separate from the total resistance of the body that portion which belongs to the skin alone.

Carpentier, Stone, Stein, and quite recently Hedley, have adopted various methods to arrive at the same end, but their results can hardly be called conclusive. By making use of internal and external electrodes, he concluded that the resistance of the skin of the cheek, or of similar skin, when circular non-polarizable electrodes of two inch diameter are used, is 934 ohms for one layer, or 1,868 ohms for the two layers, as in ordinary contacts. These figures are, however, by no means true for skin in all parts of the body, because the number of sweat and other glands are found to differ in many parts of the body, and the extent of their presence in a given area has much influence upon the resistance and consequent conductivity of that area.

A number of readings obtained by passing continuous current for five consecutive minutes through different parts of the body, appear in his constructed tables in this communication, and serve mainly to show that great power and steady flow of current, even for a short time and at low electromotive force, has to increase the conductivity of nearly all parts of the body. Some of the results are plotted on squared paper for more easy comparison. They form an interesting study, and though manifestly incomplete, throw some light upon the distribution of conductivity throughout the limbs and body. That these figures would be very different when currents at the comparatively high electromotive force of light and power circuits were passed is almost certain, but there does not seem much reason to suppose that the distribution of conductivity would thereby be altered. This paper dealt with the effects of continuous current only. Those of the alternating current require separate experimentation.

* Conductor is a substance which permits electricity to pass. It used to be thought that substances were of two distinct classes, conductors and insulators; but it is now known that it is only a question of degree of resistance. Silver is the best conductor, then other pure metals, then alloys, solutions of electrolytes follow, but at a long interval. Current passes through conductors in the ratio of their sectional area, and the inverse ratio of their length.

† Resistance can be defined as the reciprocal of electrical conductivity, because even the best electrical conductors possess appreciable resistance.

The Microphone as a Diagnostician—A Detector of Feeble Sounds of the Heart, Lungs, Blood Vessels, Chest Walls and Throat.

Dr. J. Mount Bleyer, of New York, has been engaged for a number of years experimenting with microphones for the detection of feeble sounds of all kinds, which under any other condition could not be discovered by the unaided human ear. After a number of very costly investigations towards that end, he discovered the ideal microphone for making observation upon the feeblest of sounds, which would otherwise go unnoticed. This microphone is being so arranged that physical diagnosis may be made directly with the microphone itself, in the same manner as with the present stetoscope. If, for instance, such a physical examination one wishes to preserve for reference, or otherwise, the microphone can also be attached directly to the phonograph and a record made of any special sounds of interest in the cost. This has been his ideal idea for years.

Dr. Bleyer has made numerous experiments upon the heart respiratory and the sounds of blood vessels, sounds of animals and human beings under varying conditions of life. In a specially interesting case, where death was not certain, the microphone decided the faint pulsation of the heart, which proved at once that life was not extinct. Many interesting points are connected with his investigations in use of the phonograph and microphone in relation to the science. His microphone is of original construction and principle, which accommodates itself to any position placed in on the subject under observation. This was the most difficult point to overcome.

His paper upon the new method of making physical diagnosis and use of the phonograph will appear before the International Congress at Rome, 1893.

We hope for the sake of ourselves that some one has given enough of his time to investigate a mode of discovering whether the circulation of the blood has ceased to make its rounds in the body after the doctor pronounces us no more, and save us these horrors so often related to us about cataleptic states and being buried alive. There is no doubt that such a microphone will be indispensable to the medical scientist.

How Lightning Shows Its Injuries Before a Subject so Struck.

It has lately been put upon record that while a company of soldiers were being drilled in an open plain, near Berlin, had been struck by lightning, and that a large number of them had been more or less injured. Dr. Nicolai has lately published in the German Military *Medical Gazette* the outcome of his prolonged investigation of the case. He agreed with the conclusions of many other authorities, inasmuch as he holds that the injuries received on this occasion show that, apart from mechanical and calorific effects, life is most endangered by injury to the circulatory system. The peculiar arborescent figures so generally present on the skin of unfortunate individuals struck by lightning are, according to Dr. Nicolai, mainly due to obstructions in and consequent tumefactions of the blood vessels. Another fact brought into prominence on this occasion is the marked directional influence of metallic projections, such as are frequently met with on the accoutrements and clothing of soldiers.

Some Facts Regarding Electrical Osmosis.

The fact has been long known that a movement of electrolytic fluids comparable to osmosis takes place in the direction of flow of the current, namely, from the positive to the negative pole, and fluid can in this way be made to pass through membranes or porous diaphragms against the force of gravity; and it has been proposed to make use of this process for the introduction of drugs into the body through the skin. It is evident, however, that it is rather an elaborate method of administering a drug, and only in certain cases would it have any advantage over the methods of giving drugs by the mouth or hypodermically; besides, it would be difficult to know when the proper quantity had passed into the system. It was also hoped that in this way it would be possible to apply drugs locally as, for instance, iodide of potassium to a gormand, but this cannot be satisfactorily effected because the drug is carried off by the circulation quite as fast as it enters through the skin. Still, there is one particular object which can be well and conveniently secured in this way, namely, the introduction of cocaine to produce local anæsthesia of a portion of the skin. This can be done very simply by covering the positive electrode with a thick pad of absorbent cotton well moistened with the cocaine solution and holding it steadily to the part, which should be first well sponged with hot water; with five milliamperes of current the skin should become anæsthetic in about six or seven minutes.

An electrode made hollow, cup-shaped, covered in by membrane to hold the solutions for such local medication, and the terms *cataphoresis* and *cataphoric* medication are applied to this process. An authority like Erb has suggested that it might prove useful for the introduction of remedies into diseased joints (using such electrodes as spoken of). Two such electrodes should be used and on each side, and reversing the direction of the current at intervals of five minutes.

A Few Remarks Upon the Edison-Lalande Cells.

For a number of years the medical profession generally looked upon the electro-therapeutist very much in the same light as they do to-day on an advertising quack; and it is only within the last few years that electricity has been brought into general use as a remedial agent by the profession at large. But when we look at the batteries with which the last generation had to content itself, we do not blame them, for electricity, as administered at that time, was practically an unknown quantity.

They had no sensitive milliamperemeters; no switchboards with their numberless necessary accessories and last, they did not have a proper battery.

The Edison-Lalande, we believe, is the only cell in which the current remains absolutely constant during the whole life of the battery. The physician must realize how indispensable this constancy is in medical work.

A good many, when they do not get the same result from a certain number of cells, when using them on the same patient at different times, will invariably put it down to the condition of the patient. This is not so. It is almost invariably the battery running down, and that kind of treatment must have about the same result as any other remedy administered in absolutely unknown quantities.

The Edison-Lalande battery is now preeminently the best battery made for medical treatment, but it is more especially adapted for cautery, motor and light, as needed by the specialist of the throat and nose. Its particular value for this class of work being that the battery will last with one charge for a year or more, and can then be renewed at a trifling cost. During its life it requires absolutely no attention, and, as the current remains absolutely constant, there is no danger of burning the lamps or cautery knives.

This cell has been repeatedly tested by several of the most prominent scientists in America, and their conclusions fully sustained all that is claimed for these batteries. The Edison-Lalande people offered very lately to furnish any scientific institution here and abroad with these cells for making local action tests, knowing that they will fully corroborate the claims made for them. At their Orange laboratory some tests have been made with a number of these cells before they were placed upon the market. In June, 1890, these tests were started. The loss from chemical action throughout the entire period has been less than one per cent. per month on open circuit, which is practically nothing, and there has been no local action whatever during the whole time. These batteries are now extensively used in some of the largest offices of the Western Union Telegraph Company and a large number of the most prominent railways in the United States, among which may be mentioned the Pennsylvania Railroad, the Baltimore and Ohio Railroad, the New York, New Haven and Hartford Railroad, among all of which use it on both open and closed circuit work. All this is sufficient to recommend a good thing to the profession.

American Electro-Therapeutic Association.

The second annual meeting of the American Electro-Therapeutic Association will be held at the New York Academy of Medicine, 17 West Forty-third street, on October 4, 5 and 6. Members of the profession interested in the papers and discussions are cordially invited to attend the sessions.

The programme is lengthy and promises to be very interesting and instructive. At eight o'clock Tuesday evening, October 4, the Association will be received by the Electric Club at its house, 17 East Twenty-second street. At nine o'clock, Wednesday evening, Dr. J. Mount Bleyer will deliver an illustrated lecture on "The Phonograph and Microphonograph." At nine o'clock on Thursday morning a visit will be made to the Cortlandt street telephone exchange, where Mr. J. J. Carty will do the honors. Thursday afternoon will be spent at Mr. Edison's private laboratory at Orange, where the Association has been especially invited.

An exhibition of electric batteries and instruments will be held in Room No. 40, of the Academy of Medicine, during the three days of the sessions, from 9 A. M. to sunset.

The addresses will be of exceeding value to the medical profession and no doubt the holding of this meeting will add fame to the American Electro-Therapeutic Association, and will have a very beneficial effect toward popularizing the use of electricity by the medical profession.

Courses in Electricity at the Young Men's Institute.

Electricity is getting to be such a useful and practical part of everyday life, that a knowledge of the general rules which govern the operation of electrical apparatus, and at least a slight knowledge of the principles of electricity, is almost essential to a man's thorough education. Realizing this fact, and in order to help young men who have not had the benefits of a college or technical education, numerous efforts are being made to place opportunities in the way of earnest young men to gain the necessary knowledge.

In New York one of the recent movements is that by the Young Men's Institute at 222 Bowery, where a course in practical electricity is arranged in addition to the usual courses in physical culture, literature and the mechanic arts. Two evenings in the week will be devoted to the work under a competent instructor.

The general subject matter will be units of measurements, apparatus and the best methods of construction and operation. Incandescent and arc lighting, the telephone and the telegraph will be discussed, and general information furnished concerning electrical subjects of general interest.

Mr. H. R. Benedict, a graduate of Cornell University in electrical engineering and a practical and experienced electrician, has been secured to conduct the class, which ought surely to meet with great success.

The evening educational classes meet during the first term from Monday, October 3, to Thursday, December 22, 1892, and during the second term from Wednesday, January 4, to Wednesday, April 26, 1893. The hours of instruction are from 8 to 10 P. M. The classes in practical electricity meet on Monday and Thursday evenings.

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CONTENTS.

	PAGE.
Views, News and Interviews	61
General Electric Company's G. L. M. Locomotives	61
Tenth Annual Meeting of the Street Railway Association of the State of New York	61
General Notes	64
Electric Light Flashes	65
Medical Electricity	65
The Wonders of the Telephone	66
The Electrical Salesman	66
Correspondence:	
Our Boston Letter	67
Our Seattle Letter	67
Our Chicago Letter	67
Siemens & Halske Will Manufacture in America	67
Our London Letter	67
Personal	67
Letters From a Laboratory	67
Those Marvelous Fahyahs	67
Delighted with the ELECTRICAL REVIEW	67
Telegraphers' Reunion	68
Literary	68
Electric Illumination During the G. A. R. Parade at Washington	68
American Engine Company's Plant	68
Telegraph News	68
The Trolley Begun Operations in New York City	69
An Electric Club for St. Louis	69
Brooklyn Institute	69
Report of Cornell University to the Stanley Electric Manufacturing Company of a Test of One 17,500 Watt Transformer	69
Budapest Electric Tramway	69
New York State Seizes a Telegraph Office	70
Electric Railway and Power Notes	70
Telephone Chat	70
A Machine for Painting Moulding	70
Insullac	70
Advance Information	71
Kindred Interests	72
Can Any One Explain Why This is Thusly?	72
Electrical Patents	x
Increase of Capital	x
Truex & Vail	x
The E. W. Bliss Company Open a Chicago House	x

INDEX OF ADVERTISERS.

COVER PAGES.

	PAGE.
American Electrical Works	i
Ansonia Brass & Copper Co.	xvi
Armington & Sims	xvi
Babcock & Wilcox Co.	xvi
Brush Electric Co.	xv
Bryant Electric Co.	i
"C. & C." Electric Motor Co.	xv
Crocker-Wheeler Motor Co.	i
Dixon Crucible Co.	xvi
Eastern Electric Cable Co.	xvi
Eddy Electric Mfg. Co.	i
Hampson & Co., E. P.	xvi
Jewell Belting Co.	xvi
Kellogg Iron Works	ii
Link Belt Engineering Co.	i
Moore, Alfred F.	xvi
Noye Mfg. Co., John T.	xvi
Okonite Co.	i & xv
Otis Bros. & Co.	xvi
Perkins Electric Lamp Co.	i
Schuyler Electric Co.	xv
Simplex Electrical Co.	i
Star Electrix Co.	i
Waldo & Stout	i
Waterhouse Bros.	i
Weston Engine Co.	i
Wheeler Condenser & Eng. Co.	i
Wilmot & Hobbs Mfg. Co.	xvi

INSIDE PAGES.

Allentown Foundry & Machine Co.	xi
Allis & Co., Edward P.	vii
American Bell Telephone Co.	xii
American Engine Co.	x
Baker & Co.	72
Ball Electric Light Co.	iv
Ball Engine Co.	x
Barnes Co., W. F. & John	xi
Barrett, John A.	x
Beacon Vacuum Pump and Electric Co.	72
Benedict & Burnham Mfg. Co.	iii
Bernstein Electric Co.	viii
Bickford & Francis Belting Co	ix
Bishop Gutta Percha Co.	vii
Blaisdell & Co.	xi
Brill Co., J. G.	xiii
Buckeye Engine Co.	vii
Burton Electric Co.	xiii
Central Electric Co.	xiii
Chandler, Ffrench & Co.	x
Chester Steel Castings Co.	vii
Church & Sleight	xi
Conover Mfg. Co	vii
Cowles Electric Smelting and Aluminum Co	xii
Cutter Electrical & Mfg. Co.	viii
Cutter, George	viii
Davis, Chas. H.	x
Day's Kerite	viii
Detroit Electrical Works	viii
Dewey Electric Heating Co.	xiii
Dwight Slate Machine Co.	xi
Edison General Electric Co.	v
Electric Construction and Supply Co.	iii
Electrical Mfg. Co.	xiii
Electric Gas Lighting Co.	ix
Electric Secret Service Co.	iv
Electro-Light Engraving Co.	xii
Elektron Mfg. Co.	viii
Empire China Works	xii
Enterprise Electric Co.	xii
Eureka Tempered Copper Co.	xii
Faraday Carbon Co.	xiii
Falls Rivet & Machine Co.	vii
Fitzgerald, S. G.	x
Fort Wayne Electric Co	v
Garvin Machine Co.	xi
General Electric Co.	72
Greeley & Co., The E. S.	xii & 72
Harrisburg Foundry & Machine Works	xi
Hart & Hegeman Mfg. Co.	x
Heisler Electric Co.	xiv
Holman Electrical Co., F.	vi
Holmes, Booth & Haydens	xiv
Horn & Co., G. F.	72
Hulbert Fence & Wire Co.	72
Independent Bung Co.	xii
Interior Conduit and Insulation Co.	xiii
Johns Mfg. Co., H. W.	vi
Klipstein, A.	xii
Leclanche Battery Co.	ix
Leffel & Co.	xi
Lehigh Valley Creosoting Co.	ix
MacKie, Robb	x
Marshall, Wm.	iv
Merchant & Co.	iv
National Electric Mfg. Co	vi
National Pipe Bending Co.	xi
New England Butt Co.	vi
Newton Rubber Co.	viii
New York Belting and Packing Co	xiii
New York & Ohio Co.	ix
Onondaga Dynamo Co.	iv
Ostrander & Co., W. R.	xii
Penn Life Co.	x
Phœnix Glass Co	iv
Phosphor Bronze Smelting Co.	x
Pope Mfg. Co.	72
Prentiss Tool & Supply Co.	72
Queen & Co.	x
Reed & Co., F. E.	xi
Railway Equipment Co.	ix
Rhode Island Tool Co.	iv
Ries Electric Specialty Co.	vi
Ridlon & Co., Frank	72
Rosenbaum, Wm. A.	x
Royce & Marean	xii
Russell & Co.	vii
Samson Cordage Works	viii
Sawyer-Man Electric Co.	vi
Sessions Foundry Co.	xi
Shawmut Fuse Wire Co.	xi
Shipman Engine Co.	vii
Siemens & Halske Co	iii
Solar Carbon & Mfg. Co.	vi
Standard Paint Co.	vii
Stanley Electric Mfg. Co.	ix
Stevens & Morris	vi
Stocking, E. B.	x
Swan & Lane	x
Thomson-Houston Electric Co.	v
Time Electric Co.	72
Tyndall, Wm. D.	x
Waddell-Entz Electric Co.	xii
Walworth Mfg. Co.	iii
Washburn & Moen Mfg. Co.	x
Watson & Stillman	xi
Western Electric Co.	vii
Westinghouse Electric & Mfg. Co.	xiv
Willson, H. B.	x

On the occasion of the Columbus celebration in this city, the illumination of the Brooklyn Bridge will cost $8,000, of which the city of New York will contribute $5,000 and the Bridge trustees $3,000.

The ELECTRICAL REVIEW has at all times been the champion of electrical progress and has never hesitated to defend electrical interests from malicious or ignorant attacks by the daily press. We have recently carried on with especial vigor a defense of the trolley system which has received the unmerited attention of sensational newspapers. Beginning with the New York *Sun* the prominent and sensible papers of the country have echoed our views and reprinted our editorials. Many of these papers have been fearless and honest enough to grant that they were wrong and we are right. The editors of the ELECTRICAL REVIEW are pleased to note also that brother electrical journalists have taken up the cudgel more strongly than usual, and are following our lead in the matter. The ELECTRICAL REVIEW, the *Electrical World*, the *Electrical Engineer* and the *Western Electrician* make a very pretty procession when marching toward the same goal, and form a fighting battalion whose battle cries cannot be disregarded.

We publish in this issue a report of the annual meeting of the Street Railway Association of the State of New York, recently held at Saratoga. The most interesting feature of the report is the utter oblivion into which horse railways have fallen. There were no discussions as to live stock, feed or stables; the trolley system dominated the meeting, and all the reports of committees and remarks thereon were about electric railway construction and methods. This is gratifying and significant.

The New York *Recorder* achieved a great journalistic triumph on September 22 when it published the figures of Labor Commissioner Peck's industrial census of New York State. The *Recorder* has again vindicated its motto "First of all—the news." This famous report, which knocks the ground from under the free traders' feet, shows that in one year, under the McKinley bill, the 30,000 workingmen of New York whose compensation could be ascertained were paid some $6,000,000 more in wages than they had been paid the previous year. These figures prove that manufacturers of the State manufactured more articles by over $32,000,000 worth the first year under the McKinley bill than they did the year before. The returns from the electrical industries are rather light, but they show a gratifying increase of wages under the McKinley bill in every instance save one. The *Recorder* is to be congratulated for its enterprise in giving these important figures to the public just at this time.

THE WONDERS OF THE TELEPHONE.

Under this attractive title the *Electrotechnisher Zeitschrift*, for September 2, 1892, reprints a communication recently published in the *Vienna Neue Freie Presse*, which announces a new discovery in the realm of telephony, made by Mr. Deckert, a resident of Vienna and a well known electrician.

The discovery consists in the automatic sounding of the magneto telephone when held within a distance of a few millimeters to a microphone, through which a moderately strong battery current is passing. This sound is produced whenever the air between the telephone and microphone is thrown into vibration by blowing. Every variation of the distance between the instruments changes the timbre of the reproduced sound. Again, by introducing a tube made of paper or wood between the two, the original sound grows considerably louder, and, of course, this sound may be sent over a long telephone line. It is of interest to observe that each instrument has its characteristic sound, and by a careful adjustment this sound becomes clear and strong. Indeed, this sound may be and is now used by telephone experts to judge of the quality of a microphone. From the above it is evident that this characteristic sound, inherent in each microphone, may well be used in practice.

Two microphones may be adjusted to reproduce exactly the same sound; it follows that if such instruments are on a party line, containing many other instruments, they will pick out one another, the other microphones remaining quiescent. Thus an individual signal of the most simple character is given. Again the microphone may be constructed for the purpose of reproducing a distinct musical scale; in other words, a tele-microphonic harmonica. We understand that the discoverer of this phenomenon intends to follow up the matter.

The *Electrotechnisher Zeitung* points out that in 1890 Mr. Angus Hibbard, of New York, brought this characteristic phenomenon, inherent in all microphonic apparatus, before the American electricians, claiming that he had discovered a new thing. The Hibbard effect was illustrated and described in the ELECTRICAL REVIEW for September 6, 1890. But even Mr. Hibbard's claim as the original discoverer has been disputed, the discovery being ascribed by some to Professor Hughes. The idea of employing this sound as an individual signal seems to have novelty and merit enough to justify further attention.

THE ELECTRICAL SALESMAN.

Perhaps no other industry has developed so many peculiar conditions surrounding the disposal of its product as has the electrical field. An unique genius is the fruit of this set of conditions. The genius is known as "the electrical salesman." The causes for his being have been natural only to a certain extent. There were things, peculiar things, to be disposed of by barter and trade to the people and some one had to be found to do it. The electrical salesman was not born—he has evoluted.

In ancient days, 10 years ago, the difference between the office boy and the electrical salesman was merely one of age; each knew about as much regarding electrical apparatus and its sale as did the other. But as the business grew, conditions arose which acted as the pyro solution on a photographic negative—they developed. Existing manufacturing companies attained greater proportions, alliances with other companies were made, contracts were drawn up, sub-contracts were let and re-let, territories were defined, cut, recut and defined all over again, price-lists changed nearly every hour and at last combinations, consolidations and complications (for the salesman), were effected, bringing us down to the present day, and all the time competition kept getting keener. During this tremendous advance the factories were belching forth thousands of tons of all kinds of electrical apparatus, which must be disposed of. It was then that the electrical salesman began to evolute. He was the all-important medium between producer and consumer, employed to tell the merits of apparatus to the buyer and to report defects, as they came under his notice, to the manufacturers that they might apply the remedy.

The electrical salesman, in all truth, has been *the* factor on the commercial side of electrical development; he is the king pin of the electrical car of progress. He has been maligned, insulted, given the lie and generally maltreated by the public at times, but only at times, because he has many friends and deserves more. It is only the absurd few who do not understand his genius that have abused him, and even these few, we dare say, will change their opinions of him ere long.

There are many electrical salesmen who hold responsible and valuable positions today, all owing to the experience acquired during their evolution. These will move up higher and others will follow along after them. It is probably true that nine-tenths of our electrical brethren have been or will be salesmen before they die.

To be the *beau ideal* of electrical salesmen a man should begin with perfect confidence in himself, supreme assurance as to his certainty of victory, and a *quantum sufficit* of technical knowledge. In addition, he must possess the detective's instinct in ferreting out "jobs," the reporter's "nose for news," so that he'll know a customer when he sees one, an ability for making and keeping friends, good conversational powers, the wiles of a diplomat, the silver tongue of an orator and the sincere and convincing arguments of a practiced debater. And he must be always resourceful and ready at any and all times to have recourse to expedients to overcome his competitors. As we said before, an electrical salesman is not born with all these attributes of genius, but he assimilates them as he evolutes and ends by surprising himself at his own abilities.

In the last issue of the ELECTRICAL REVIEW appeared the following editorial paragraph:

> The ELECTRICAL REVIEW is in receipt of an inquiry for the address of the inventor of an "electrical reciprocating tool for sculptors." Will the inventor please step forward?

The ELECTRICAL REVIEW reaches its New York city subscribers on Wednesday morning. On Thursday afternoon, September 22, we received by mail a letter from the inventor of such a device as was inquired for, asking to be put in communication with our correspondent. It pays to subscribe for and read the ELECTRICAL REVIEW.

CORRESPONDENCE.

OUR BOSTON LETTER.

Hopedale, Mass., Electric Company has awarded the contract for construction of its factory to Messrs. Weed Brothers & Lent, of Milford, Mass.

Manager Geo. F. Poor, of the W. S. Hill Electric Company, this city, has been away on a business trip a few days, and will return September 27.

Mr. Geo. T. McLauthlin, of the old established and widely known machinery house of McLauthlin & Company, this city, has recuperated from a severe sickness.

The Electrical Exhibit to be at the Mechanics' Fair, this city, commencing Monday, October 3, will surpass that of any previous exhibition, both in quantity and variety.

The Naumkeag Street Railway Company has commenced work on its new power plant at Salem, Mass. It is said that this plant when finished will have a capacity exceeding 2,000 horse-power. It will have a chimney 160 feet high.

The Schuyler Electric Company, Middletown, Conn., is reported to have received an order from the United States Government recently for a search-light of 50,000 candle-power. This light will be placed on the Statue of Liberty in New York Harbor.

The Massachusetts Institute of Technology will erect a building 66x58 feet and five stories high, in this city, to be wholly devoted to the study of architecture. The institute is also to have in its Department of Applied Mechanics a new horizontal Emery testing machine of 300,000 pounds capacity, which will contain all the essential features of the 800,000 pound testing machine at the Watertown Arsenal.

Mr. E. Marshall, formerly New England agent of the Graves Elevator Company, has been appointed manager of the Eastern department of the Springfield, Mass., Foundry Company, with headquarters at No. 103 Milk street, this city. Mr. Marshall will devote most of his time to making known, throughout his territory, the merits and advantages of the "Atlas" elevator, one of the principal products of company named.

The Inter-State Electric Railway Company will have the Pawtucket, R. I., end of its line completed within a week, and electric cars will be in operation between city named and Attleboro, Mass., via Central Falls, Valley Falls and Farmingdale, by the first of October. The company's proposed Providence division, between that city and Pawtucket, will be constructed and equipped in time to have electric cars in operation early in the summer of 1893. W. I. B.

Boston, September 24.

OUR SEATTLE LETTER.

The Western Union Telegraph Line has been finished to Woolley and connected with the line on the Seattle & Northern Railway.

The Telegraph Line along the Monte Cristo Railroad will be finished for business by the first of January. The poles are all cut and the holes for them are being dug.

The Question of forcing the electric street railway companies to light the suburban streets through which they run is still being considered by the Seattle city council.

The Tacoma Light and Water Company, which has been threatened for a long time with a citizens' or municipal light and water company, has agreed to sell its plant to the city for $2,100,000.

Mayor Huson, of Tacoma, recommends that the electrical apparatus of the police and fire departments be looked after by one instead of two electricians. Efforts are being made to cut down expenses in other municipal departments.

The Sunset Telephone Company now has 900 telephones in use in this city. The company is extending its wires through the country and is introducing in this city and Tacoma public telephone stations with automatic nickel-in-the-slot devices for making payments.

The Rainier Power & Electric Company, of Seattle, is pushing work on its electric railway. The line in the north end is already in operation, and that through the heart of the city will be completed in about a month. The company will run six passenger cars and a freight car. The power plant is already in place, and is to be strengthened by a machine capable of supplying 100 arc lights, and another for supplying 1,000 incandescents. The company has obtained a franchise for another north end branch.

The Stock of the Washington Electric Light Company, of Seattle, was bought by Fred. E. Sander, and sold by him to C. S. Gleason. The company had a plant supplying about 2,000 incandescent lights in the southeast part of the city. Mr. Sander had begun extending the wires to the heart of the city in order to compete with the Union Electric Company when Mr. Gleason bought him out. There are now four companies competing for electric light business in the city, the Union, the Gas and Electric Light, the Washington and the Ranier Power and Railway.

The Stock of the Seattle Gas, Electric Light and Motor Company, has been sold to a syndicate of Seattle and St. Paul capitalists. They have re-incorporated under the name, Seattle Gas and Electric Light Company. The capital stock is increased from $1,000,000, and the incorporators are G. M. Nelson, of St. Paul; J. D. Boyd, of West Duluth; Maurice McMicken, H. G. Struve, R. C. Elloit, Lester Turner and John Mather, of Seattle. The company has elected the following officers: president, Hon. H. G. Struve; vice-president and general manager, John Mather; secretary and treasurer, L. Turner. Mr. Mather has had seven years' experience in the gas and electric business, and is a keen, wide-awake business man. After closing his business at West Superior he came to this city to make his permanent residence here. In regard to the plans of the company, he said: "We shall also extend our electric plant. We now have only an arc light plant, but we intend to go into the incandescent lighting business as well." H. L.

Seattle, Wash., September 15.

OUR CHICAGO LETTER.

T. A. Pamperin, general manager of the Electrical Manufacturing Company, Oconto, Wis., is enjoying a two weeks' trip in the East.

Mr. Richardson, of the Enterprise Electric Company, reports business at their St. Louis branch flourishing, and that trade in general is much better than they had reason to expect.

The Detroit Electrical Works, through their Chicago Office, have just closed a contract with the Consolidated Electric Railway and Light Company, Salina, Kan., for four 30 horse-power equipments, complete, together with overhead construction.

The Chicago Electrical Association will resume their regular meetings which were suspended during the summer months, on Tuesday, September 27, on which occasion Mr. C. A. Brown will present a paper; subject, "What Constitutes an Invention."

The Central Electric Company are preparing an exhibition at their warerooms of interior conduit and supplies, erecting a house complete, showing the method of wiring and the connections by junction boxes, etc. The exhibition will be unique and practical.

On account of increased business and the need of a larger office force, George Cutter has been obliged to secure more spacious quarters than formerly used, and is now located at No. 339 "The Rookery." The offices are nicely fitted up, having plenty of room and good light. The change will, no doubt, give George Cutter's force of hustlers a chance to spread themselves.

Mrs. George Brown, wife of the general manager of the Pullman Palace Car Company, and mother of Chas. E. Brown, of the Central Electric Company, died at Gloucester, Mass., on the 12th inst., as the result of injuries received four week ago. She was driving with friends, when the carriage was overturned and her spine hurt. Mr. Brown has the sympathy of his many friends in his late bereavement.

The Sales of Washington Carbons by the Central Electric Company, who are the Western agents, during the past week, have been very large, and the Central can be congratulated upon carrying the goods in stock and giving their customers ready shipments. They also report large sales of triple and double braid water-proof wire, besides a steady demand for Okonite wire, cord and Manson tape. M. J. B.

Chicago, September 24.

Siemens & Halske Will Manufacture in America.

AN INTERESTING CABLE DISPATCH FROM BERLIN.

The *Journal of Finance*, of this city, published the following cablegram in its issue for September 23:

BERLIN, Sept. 22.—It is stated here that prominent American financiers who are interested in electrical enterprises in the States have been here trying to bring about an arrangement by which they could obtain control of all the inventions of Dr. Siemens. Their plan was to turn over all the patents to the Edison Company in New York.

In addition their purpose was—and this was their chief aim—to head off plans which Siemens and his friends have for branching out in America. The mission has failed. The financiers have returned to America, probably arriving in New York to-day.

Siemens will go on with his original programme for establishing a company of his own in the United States.

A number of central station managers throughout the country are experimenting with smoke consumers.

OUR LONDON LETTER.

The Metropolitan District Railway have voluntarily taken a step in the right direction. For some months past, they have allowed into their carriages a few of Mr. Tourtel's automatic machines, which retail electric light to passengers by pennyworths. A contract has now been made by that company with the Railway Electric Reading Lamp Company to install 10,000 reading lamps in the carriages of the District Railway, and we understand that similar contracts are being negotiated with other companies. It is a great pity that, according to present arrangement, it is intended to retain the gas lamps in the roofs of the carriages, the electric lamps only supplying additional light for passengers desiring to read. The light may be thrown by means of a reflector to any part of the carriage. It is about three candle-power, and burns for about 30 minutes. Then it is extinguished automatically, but may be renewed by putting another penny in the slot. We trust a way will be found in the near future to supply a permanent and sufficient electric light during the whole journey.

It is intended during the present recess to make considerable further extension of the system of electric lighting at the House of Commons. Most of the rooms on the basement and on the ground floor of the building, the various smoking rooms and dining rooms, the library and the tea room, the minister's private apartments, etc., have been furnished with incandescent lamps in substitution for gas, and upstairs the new illuminant has been introduced into the reporters' gallery, and also into some of the committee rooms. The committee corridors are, however, still lighted by gas, and in the bulk of the committee rooms the only resource on dull and foggy days, is the old-fashioned Colza lamp. It is not proposed to make any alteration in the lighting of the house itself, for the elaborate arrangement of gas lights above the roof took many years to bring to the condition in which we now find it, and it is so connected with the ventilation that any alteration would necessitate the rebuilding of the whole upper part of the structure.

The Royal Commission appointed to inquire into the best means of establishing communication between light-ships, lighthouses and the shore have completed their tour of inspection; and the good work which it is hoped will secure ready assistance for vessels in danger, and promote the saving of life, has actually began. On Tuesday, the telegraph steamer "Monarch," having on board Lieut. Williams and Mr. Lumsden, the electrician, arrived at the Isles of Scilly; and at once commenced operations connecting by telephone the coastguard stations at St. Mary's, St. Agnes, Bryber, Tresco and St. Martin's. Yesterday the cable from Bryber to Tresco was laid, and from the Cove, St. Agnes, about half way to Portheressa Beach, St. Mary's, where the end is buoyed for the light. This system of communication will, doubtless, be of very great service for conveying news of wrecks or vessels in distress to the life boat stations at night or during fog. JOSEPH FFRENCH.

London, September 16.

PERSONAL.

Mr. C. A. Coffin, president of the General Electric Company, returned last Sunday from a brief European trip and registered with his family at the Murray Hill Hotel.

Mr. F. B. Ross, having resigned from the Chicago Great Western Railway to accept service with another company, Mr. W. O. McNaughton has been promoted to the position of traveling passenger agent, with office at 195 East Third street, St. Paul, Minn.

Mr. Joseph Wright, of Bennett & Wright, Toronto, Ont., paid the ELECTRICAL REVIEW a pleasant call last week. Mr. Wright's firm has just secured the contract for supplying electroliers for the new parliament buildings in Toronto, and visited New York on business connected with this very substantial award.

Mr. C. E. Spagnoletti, often referred to as the father of railway telegraphy and the inventor of numerous electrical appliances for working the block system on many home and foreign railways, has just resigned the appointment which he has held for over 35 years as chief electrician and telegraph engineer of the Great Western Railway Company of England.

Sir J. Whittaker Ellis, ex-lord mayor of London, has been on a tour through Canada, and is expected to arrive in Boston this week. His purpose is to report upon the operations of the electric railroads in Boston, its suburban development and to discover good fields in America for the investment of English capital through the enhanced values resulting from this means of communication.

LETTERS FROM A LABORATORY.—XIV.

BY JULIAN A. MOSES.

When you are able to make a joint with two tubes of the same size, try to make one with tubes that are of different bores. Naturally the small tube must be enlarged to the diameter of the large tube, or the diameter of the larger must be reduced to equal that of the smaller. Either of the two methods may be used, but I prefer that the larger be reduced to the smaller diameter, as there is a greater supply of glass to work with, and it is easier and more expeditious than to enlarge a tube. To reduce the bore of a tube, draw a handle on the end, and cut with the glass cutter's knife at the place where you judge will be of the required diameter when separated; this diameter should be slightly smaller than that of the small tube, for glass in being heated always has a tendency to melt together and assume a spheroidal shape. To illustrate this phenomenon, draw out a thin filament of glass and allow it to melt into a ball by holding it in the flame. Those balls when carefully made may be employed as magnifying glasses, if mounted in the bottom of a pill box which has had a small round hole punched in the center to hold this simply made lense.

As soon as these simpler exercises are completed, the next and perhaps more difficult should be attempted. It is to make a funnel. This apparently simple piece of apparatus is in reality one of the most difficult of the simpler exercises to make, and includes those before mentioned. The manipulation may be summarized as follows: Attach a large tube to a smaller; blow a small elongated bulb on the large end, and puff out the extreme end. Hold the smaller tube in your right hand and rotate it evenly in the flame, then grasping the piece of pointed gas carbon in your left hand, insert it in the bulb; hold it firmly against the apex of the cone and, rotating the tube back and forth very rapidly, gradually press the carbon against the edge. Repeat this until the required spread is obtained. If this is done evenly, a perfectly formed conical funnel will be your reward.

Never leave the ends of the tubes in the condition that they are in after being separated, as these sharp edges are liable to cut the hands and inflict severe wounds. Fuse the ends slightly and the sharp edges will disappear. It would not be inopportune here to say that the best thing to do for a cut is to paint the wound with a thick solution of collodion, meanwhile holding the two sides together until the collodion becomes set or hard. The collodion in setting, contracts and draws the lips of the wound together, holding them in place while nature does the healing. Burns are also liable to be an unpleasant accompaniment to the study of glass blowing, and are sometimes rather painful and difficult of healing. They should be immediately attended to and kept as much as possible from the air. Wrap the injured part in cotton batting which has been previously steeped in a mixture of glycerine and common salt. To make this mixture, which should be kept continually at hand, dissolve a table spoonful of salt in as little water as will completely dissolve it to make a saturated solution, and of this and glycerine take equal parts.

Those Marvelous Fahyahs.

TO THE EDITOR OF ELECTRICAL REVIEW:

The heading in your issue of September 10 saves you, otherwise we might have thought that Homer nodded. Some of the statements in the explanation of the feats of the "marvelous Fahyahs" are equally wonderful, especially where the earth revolves around the sun once in every 24 hours!

G.

Jersey City, N. J., Sept. 20.

Delighted with the Electrical Review.

TO THE EDITOR OF ELECTRICAL REVIEW:

Will you please send me your new catalogue of electrical books. Allow me to say also that I am immensely delighted with your REVIEW. Yours respectfully,

V. DABREY.

43 East Twenty-ninth street, N. Y.

Telegraphers' Reunion.

THE SOCIETY OF UNITED STATES MILITARY TELEGRAPH CORPS AND THE OLD-TIME TELEGRAPHERS HOLD THEIR TWELFTH REUNION AT OMAHA.

On September 14 the Society of United States Military Telegraph Corps and the Old-Time Telegraphers' Association met in annual session in Omaha, Neb. The visiting telegraphers were tendered a public reception at the *Bee* building in the morning. The afternoon was given up to drives through the city.

A reception was held in the reception hall of the *Bee* building, which was handsomely decorated. Edward Rosewater, editor of of the *Bee* and president of the Old-Time Telegraphers, delivered an address of welcome. President Plumb, of the Military Telegraphers' Association, responded and then read his annual address, the opening portion of which was as follows:

Comrades: Heretofore I have sought to enforce our claims to congressional recognition by recitals of the darings and achievements of the military telegraphers during the civil war. If, in my history, the argument before the house committee on military affairs and many annual addresses, I have not covered the whole field, I cannot hope now to do so, and hence turn to another and sadder phase, to speak specially of departed comrades.

At the completion of the address, A. G. Safford, of the committee on congressional action, reported the progress made in endeavoring to secure the passage of a bill placing military telegraphers on a plane with regularly enlisted men, so as to secure discharges. He reported but little encouraging action. A congressional committee was appointed, consisting of A. G. Safford, of Washington; W. J. Dealy, of New York; J. H. Emerick, of New York; E. Rosewater, of Omaha, and Dr. J. E. O'Brien, of Scranton, Pa.

After disposing of various matters of business the association ajourned until the next day. In the afternoon the delegates resolved themselves into a circus party and took in the Barnum show. They then took carriages for Fort Omaha and witnessed the dress parade. In the evening a banquet was enjoyed at the Millard. The Society of Military Telegraph Corps held its final meeting at 10 o'clock A. M., on September 15, leaving the same night on a pleasure trip to Denver. The Society decided to meet in Chicago, next year, the time to be determined by the Presidents of the two telegraphers' societies.

The following officers were re-elected for the ensuing year: President, William R. Plumb, Chicago; vice-president, William B. Wilson, Philadelphia; secretary and treasury, J. E. Pettit, Chicago.

The president was authorized to appoint a committee on congressional action, and to draw funds for necessary expenses.

The old-timers met after the Military Telegraphers had ajourned and completed the business of their session. The following officers were elected for the ensuing year: President, A. H. Bliss, Chicago; vice-president, William B. West, New Orleans; secretary and treasurer, William J. Dealy, New York; Historian, George C. Maynard; Executive Committee, R. J. Hutchinson, New York; J. M. Turner, Charleston, S. C.; W. B. Wilson, Philadelphia, and T. C. Mason, Tacoma.

LITERARY.

We have received a very interesting and valuable pamphlet entitled, "The Fire Hazard of Electricity," being a course of lectures read before the Fire Underwriters' Association of the Pacific, by George P. Low, electrical inspector of the Pacific Insurance Union.

The features of timeliness and authority, on which the *North American Review* is said to pride itself, are again exemplified by the fact that its next number (October) will include articles on "The Buffalo Strike," by the superintendent of the New York Central and Hudson River Railway, and on "Safeguards Against the Cholera," by Surgeon-General Walter Wyman, President Wilson of the New York Board of Health, Dr. Cyrus Edson and Secretary Abbott of the Boston Board of Health.

Electric Illumination During the G. A. R. Parade at Washington.

During the G. A. R. parade at Washington, on September 20, the electrical illumination of the city in the evening added much to the brilliancy of the display.

It was one of the attractions of the reunion provided by the Citizens' Committee and was a complete success. Pennsylvania avenue, from the Capitol to Seventeenth street, was ablaze with colored lights. Every available dynamo in the city, public and private, was brought into requisition, and many had been shipped to Washington, especially for this display.

The feature of the illumination was the display along both sides of the avenue of brilliant representations of corps badges. Seventy of these had been placed on supports at convenient distances in three colors, red, white and blue, the respective colors of the first, second and third divisions. Each of these was outlined in incandescent lights of the same color as the badge. There were also placed at short intervals portraits in oil of the leading generals of the war. Just above each of those and above the corps badges were the names of many of the great battles of the war in which the respective corps took conspicuous part.

At the head of Fifteenth street, at the entrance to Executive avenue, was a monster *fac-simile* of the G. A. R. badge, 18 feet in height. It was made up of incandescent lamps of the various colors of the badge, and produced a grand effect. A duplicate of the piece was also shown at the corner of Pennsylvania avenue and Seventh street. Over one of the entrances to the White House, spanning the arch of the gateway, had been placed a great fan of 1,300 lamps, arranged so that they could be turned on and off, giving the fan the appearance of opening and shutting. Over the other gate was a great shield, with an eagle surmounting it.

A fine display, and something entirely new in Washington, was shown in the White House grounds in front of the mansion. Here innumerable lights were half hidden in the shrubbery, all of them changeable in character, disappearing and reappearing in the most bewildering manner. The trees and shrubbery seemed fairly magnetized, and the effects were extremely beautiful. Throughout the grounds were a number of other electrical devices, among them large wheels, turning and changing colors with each revolution.

The illumination of the Treasury Building with colored electric lights was especially fine and notable, as also were a number of large set pieces at intervals along the avenue, the most conspicuous being a great anchor of blazing light placed at the corner of Tenth street. Powerful search-lights, thrown from the tops of high buildings, produced a dazzling effect.

The display continued until midnight, and was witnessed by countless thousands, who regretfully disappeared in the darkness that succeeded the turning off of the current.

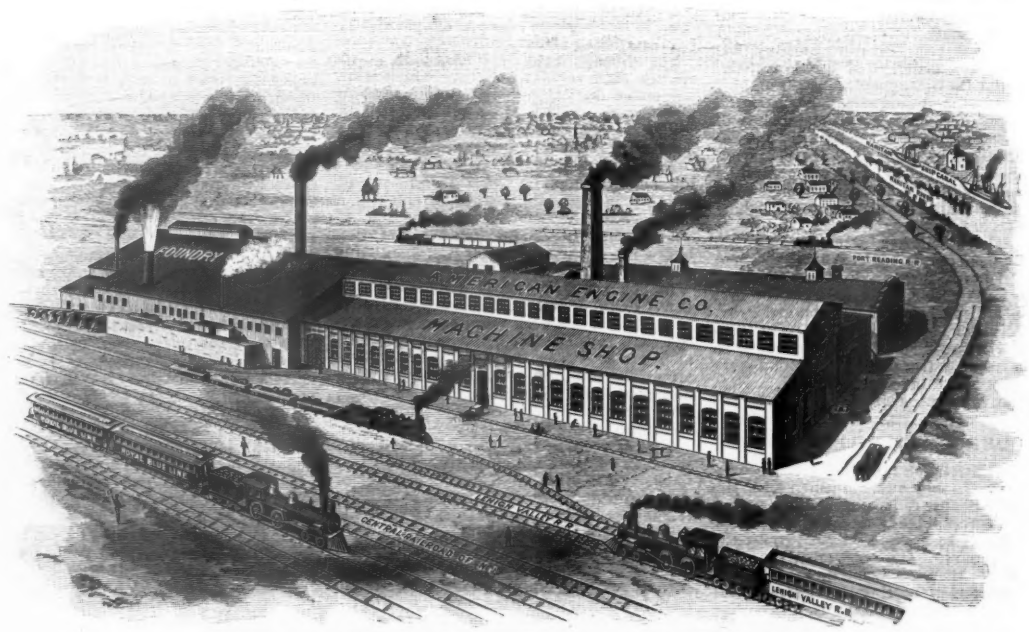
American Engine Company's Plant.

The extensive plant of the American Engine Company, at Bound Brook, N. J., furnishes still another instance of American enterprise, and illustrates the rapid development of our manufacturing industries, especially noticeable in the many channels opened up by the demands of the constantly widening electrical field.

The ground now occupied by the works of this company, comprising some 235 acres, is splendidly located for their purpose, and the railroad facilities are unsurpassed, the Lehigh Valley, Philadelphia and Reading, and Jersey Central tracks passing on one side, and the Port Reading railroad on the other. Switches from the main lines of the various roads enter their grounds, and connect with tramways running through the different departments, thus enabling them to transfer their heaviest engines from any part of the works directly to the cars.

The offices are very commodious and handsomely fitted up in hard wood, are located in the main building and directly in their rear is the tool-room, a very important feature, and the large vaults in which are stored the special tools, drawings, specifications and patterns.

The machine shop and foundry occupy jointly the largest building of the group, and both are models of their kind.



PLANT OF THE AMERICAN ENGINE COMPANY AT BOUND BROOK, N. J.

Here will be found every possible convenience for the rapid handling of the work and the finest machinery known to the trade, most of it coming from such well known makers as the Brown & Sharpe Manufacturing Company, the Pratt & Whitney Company, the Niles Tool Works, and the Putnam Machine Tool Company.

Prominent among the special tools is a planer 36 feet long, having a planing surface of 72 inches square by 20 feet in length. Another feature of the machine shop is a 10 ton traveling electric crane.

The foundry adjoins the machine shop and is also fitted with an electric crane of 20 tons capacity.

The boiler room contains three large boilers, and adjoining this is the electric plant of the establishment, consisting of three dynamos, one of which is used for supplying current to the electric cranes, and the other two for lighting the factory buildings and the streets and houses in the neighborhood. The latter are Edison incandescent machines with a capacity of 810 lights each.

The entire plant is protected from fire by a complete system of sprinklers, aside from the large fire pump connected with the mains from Bound Brook.

Speaking tubes connect the offices with every department in the works, and the company also have a special telegraphic code for communicating with their branch offices.

The plant as it stands to-day represents an outlay of about $400,000, and this entire development has been accomplished within the past 18 months. The adjoining property has been bought in, streets opened up and houses erected, and a flourishing town with every modern convenience is rapidly growing up around them.

This development is due to the enterprise of Dr. R. V. Pierce, the president of the company, and of Elmer S. Smith, inventor and general manager, whose efforts in this direction have been tireless, as shown in the splendid results already achieved.

TELEGRAPH NEWS.

The telegraph line over the Ohio Valley Railroad is now completed and ready for business.

A construction gang of the Postal Telegraph Company is in Macon, Ga., for the purpose of extending their line to Columbus and thence westward. Work will be commenced at once.

The Alton Railroad is stringing copper wire on all its telegraph poles in the limits of Bloomington, Ill. The smoke from engines eats up the wire previously in use and a change was necessary. The wires will also be replaced in the yards of all large cities where considerable switching is done.

A small blaze did a good deal of mischief at the Postal Telegraph Company's Chicago main office in the Phœnix building last week. One of the wires which enter the basement ignited the flooring. The ends of all the main line cables were burned out. After a delay of a few hours to the business of the company, the damage was repaired. The loss did not exceed $200.

Recently a dozen farmers of Leoni township, Mich., have put up a telegraph line of their own, and are now able to communicate with each other whenever desirable. The line, which is eight miles in length, starts at the post office in Leoni village and runs out into the township. It was put up through the influence of one young man, who had previously learned the art of telegraphy, and and who taught it to one member of each family interested. The expense of the line was $200, which was divided equally between the subscribers, and whenever another wishes to join the circuit he puts up his own wires, secures an instrument and bears his proportion of the expense of maintaining the system. Each house has a letter by which it is called, and whenever one farmer's wife wishes to invite her neighbor to tea, all that is necessary is to set the ticker at work. The line is also utilized in inquiries for mail at the post office, by which many miles of useless travel are saved during the year. The postmaster at Leoni, who also has charge of the railroad telegraph office, express office and the general store of the village, has his hands full and occasionally is heard to complain of the time taken by the members of the syndicate in inquiring for mail.

The Trolley Begins Operations in New York City.

On Sunday morning, September 18, at 9 o'clock, the Union Railway Company began running its trolley lines between 134th street and Fordham. Cars were run on the Boston avenue branch the following day. The company expects to have its whole system in operation within a few weeks.

The Union Railway Company is the name of the new company which is introducing the trolley system in the annexed district. It has taken over the horse car lines of the Harlem Bridge, Morrisania and Fordham Railway Company, formerly known as the "Huckleberry Road."

The power house, which is the first to be erected in New York city, is located at West Farms, and supplies power to the 20 miles of double track already installed. The power house is built of brick, is 200 feet long and 75 feet wide, has a smoke-stack 200 feet high and is equipped with a 75 foot traveling crane with a lifting capacity of 20 tons. The roof is of the iron truss frame type. The steam plant at present consists of four 500 horse-power Babcock & Wilcox boilers and four compound condensing Corliss engines of 400 horse-power each. The electric equipment consists of four 300 kilowatt Thomson-Houston multipolar generators, two of which are now supplying current to the lines while the other two are held in reserve. The generators are belted directly to the engines. The capacity of the station can be doubled without interfering in the least with the operation of the present plant.

The trolley lines run for several miles under the structure of the Suburban Road, an extension of the Third Avenue elevated road. The trolley wires are suspended from the elevated structure. About 30 cars equipped with Thomson-Houston single reduction motors are now in operation, and on the lines mentioned above about half an hour's time is saved over the round trip as formerly made with horse cars.

An Electric Club for St. Louis.

At the Mercantile Club, St. Louis, the evening of September 17, there was a representative gathering of electricians and gentlemen interested directly and indirectly in electricity, who had answered a call to be present and discuss the proposition to form a St. Louis Electric Club. After an elegant supper, Mr. James I. Ayer, general manager of the Municipal Electric Lighting and Power Company, arose and made a few preliminary remarks in explanation of the call for a meeting. The National Electric Light Association, of which he is president, had decided to hold its next convention in St. Louis, in February, and had selected the city which is without an organization or club of any kind in preference to several Eastern cities where the National Association is well represented. Mr. Ayer thought that, in view of this fact, the electricians of the city should form an organization, and in going around among his friends here had found the field ripe for such a move. He and three other electricians had issued the call to a number of gentlemen interested in electricity, but had not asked all to be present, as it was merely to be a meeting to discuss the proposition of forming a club and he desired the gentlemen present to express their views. Capt. McCullough, W. L. B. G. Allen and Louis Nahm spoke in favor of the scheme and heartily endorsed it. A temporary organization was then formed with Mr. Ayer as chairman, and Mr. C. R. Scudder as secretary. A committee on permanent organization was named, consisting of Messrs. Ayer, McCullough, Wagner, Allen and Bohle, and they were instructed to draw up a constitution and by-laws and report at the next meeting of the body, which was set for Friday, October 14. Among the gentlemen present were: F. Schlosser, superintendent electric department Laclede Gas Light Co.; George F. Durant, general manager Bell Telephone; C. R. Scudder, secretary St. Louis Electric Light and Power Co.; James I. Ayer, general manager Municipal Electric Lighting and Power Co.; H. P. Broughton, of the Municipal Electric Lighting and Power Co.; H. A. Wagner, superintendent Missouri Electric Light Co.; Robert McCullough, general manager St. Louis Railway Co.; J. A. J. Shultz, president Shultz Belting Co.; R. H. Bohle, manager Western Union Telegraph Co.; H. L. Parker, A. W. Meston, F. W. Churchill, of the Emerson Electric Co.; Louis Nahm, American Electric Manufacturing Co.; W. Mathews, St. Louis Electric Supply Co.; R. V. Scudder, Western Electric Manufacturing Co.; C. E. Sharpe, Southern Electric Supply Co.; E. J. Bagnell, engineer Lindell Railway Co.; H. C. Henley, inspector St. Louis board fire underwriters; W. L. B. G. Allen, St. Louis Engineering Co.; W. H. Bryan, mechanical engineer.

Letters were received from the following gentlemen who were out of the city, or who were prevented from attending the meeting by previous arrangements: James Campbell, vice-president Municipal Electric Lighting and Power Co.; S. M. Todd, president Missouri Electric Light and Power Co.; Harry Scullin, of the Union Depot Railway Co.; A. J. O'Reilly, supervisor city lighting; B. J. Arnold, General Electric Co.; P. C. Maffit, president Missouri Railway Co.; C. Dougherty, manager Postal Telegraph Co.; E. H. Abadie, Wagner Electric Co.; James H. Rotehamel, president Columbia Incandescent Lamp Co.; Alexander Ross, general manager Laclede Gas Light Co.; Leslie Allen, St. Louis Engineering Co.

Brooklyn Institute.

The Brooklyn Institute of Arts and Sciences has issued its prospectus for 1892-3. In the department of electricity 15 illustrated lectures will be given at the regular meetings of the department, which will be held on the first and third Fridays of each month as heretofore. The announcement of the lectures and meetings will be made on the monthly bulletins and on a special circular.

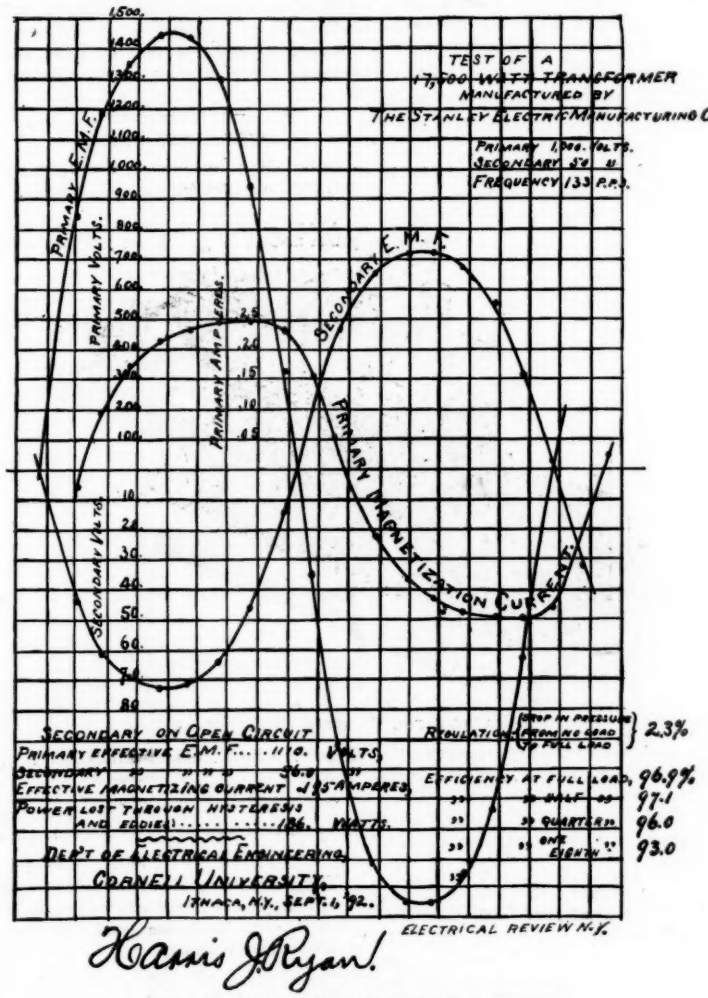
A large electrical exhibition will be given by the department at the Clermont Avenue Rink for three weeks. A special announcement will be made as soon as the arrangements for the exhibition are completed.

The leading electrical experiments that are new to the science of electricity will be repeated before the department during the year under the auspices of a special committee.

Report of Cornell University to the Stanley Electric Manufacturing Co. of a Test of One 17,500 Watt Transformer.

The method employed for testing your 17,500 watt, 1,000x50 volt transformer for a frequency of 132 p. p. s. was as follows:

The power dissipated through hysteresis, eddy currents, etc., was determined by the use of a contact maker, condenser and electrometer as described in the paper on transformers in the proceedings of the American Institute of Electrical Engineers, Vol. VII p. I. The transformer received current from a Westinghouse alternator at 132 p. p. s. This machine was driven by a high speed 60 horse-power tandem compound automatic engine that has a fair speed regulation. It was found in the out-start, however, that the total loss of power in the transformer at full load was in the neighborhood of but 3 per cent. of the load. On account of the natural drift of the speed of the engine within certain limits, it was not found practicable to measure the total power delivered to the transformer, and that given out by it with such a degree of accuracy that the probable error would be less than 1 per cent. This would mean a probable error in the determination of the total power dissipated by the transformer of 30 per cent.


TEST OF A
17,500 WATT TRANSFORMER
MANUFACTURED BY
THE STANLEY ELECTRIC MANUFACTURING CO.
PRIMARY 1,000 VOLTS.
SECONDARY 50 "
FREQUENCY 133 P.P.S.
PRIMARY E.M.F.
PRIMARY VOLTS.
SECONDARY E.M.F.
SECONDARY VOLTS.
PRIMARY AMPERES.
PRIMARY MAGNETIZATION CURRENT
SECONDARY ON OPEN CIRCUIT
PRIMARY EFFECTIVE E.M.F. 1110. VOLTS.
SECONDARY " " " 26.9 "
EFFECTIVE MAGNETIZING CURRENT 1.95 AMPERES.
POWER LOST THROUGH HYSTERESIS AND EDDIES 186. WATTS.
REGULATION (DROP IN POTENTIAL FROM NO LOAD TO FULL LOAD) 2.3%
EFFICIENCY AT FULL LOAD, 96.9%
" " HALF " 97.1
" " QUARTER " 96.0
" " ONE EIGHTH " 93.0
DEPT OF ELECTRICAL ENGINEERING,
CORNELL UNIVERSITY.
ITHACA, N.Y., SEPT. 6, '92.
ELECTRICAL REVIEW N.Y.
Harris J. Ryan.

TEST OF A 17,500 WATT STANLEY TRANSFORMER.

Were there no magnetic leakage in transformers, we would get a measure of the power lost through heating of the primary and secondary conductors by the product of the drop in volts observed on the secondary into the current output of the same. This measure would then be rigidly accurate when the secondary is at work on incandescent lamps and the primary maguetizing current is as small as it is for this transformer. Actually, however, there is always some magnetic leakage that increases with the output of each transformer, and lowers the electromotor force of the secondary by lessening the magnetization through the same. Since this action results in no waste of power, in ignoring its presence we shall make an error that counts against the transformer. It is highly probable that in a transformer with a drop in pressure due to load of only 2 per cent. or 2½ per cent., the error thus made against the efficiency at full load will not amount to more than ½ per cent.

The drop of secondary pressure, due to load, was observed by taking simultaneous readings of the effective pressure at the terminal of the primary and secondary, when the transformer was loaded with lamps to an output of 17,500 watts and when it was unloaded. In this way errors, due to the drift of the speed of the engine, are eliminated.

The accompanying diagram with its curves gives graphically the observations made for determining the power taken up by the transformer with the secondary on open circuit. From the curves of primary impressed electromotive force and primary current, the power lost through hysteresis and eddies in the iron core was determined to be 186 watts with the pressure at the primary terminals of 1,110 volts. It is desirable to know the power lost at the standard pressure of 1,000 volts. In making this deduction we have assumed that this loss varies as the 1.7 power of the magnetic density in the iron core. The power lost in the transformer on open circuit at a primary pressure of 1,000 volts is, therefore, 157 watts.

The drop in the secondary pressure, due to load, was determined from the following effective primary and secondary pressure readings, which are given as the mean of a number of observations:

Full Load.		No Load.	
Primary.	Secondary.	Primary.	Secondary.
1,077	53.50	1,122	57.03

Reduced to a primary pressure of 1,000 volts:

Full Load.		No Load.	
Primary.	Secondary.	Primary.	Secondary.
1,000	49.67	1,000	50.83

Drop 1.16 volts, or 2.32 per cent.

Power lost in heating the conductors: $1.16 \times 350 = 405$ watts.

The variation of the efficiency with the load is given by the following equation:

$$\text{Efficiency} = 100\,\frac{W}{W + H + KW^2}$$

Where W = the output of the transformer in watts.

H = the power lost through hysteresis and eddies in the core,

K depends upon the effective resistance.

Substituting the numerical values of H. and K, we have:

$$\text{Efficiency} = 100\,\frac{W}{W + 157 + .00000132\,W^2}$$

The efficiencies at full load, half load, quarter load and one-eighth load are 96.9 per cent., 97.1 per cent., 96.0 per cent. and 93.0 per cent., respectively. For one 16 candle-power lamp the efficiency is about 24 per cent.

For a determination of the all-day efficiency when the primary pressure is kept up at all hours of the day, it is assumed that this transformer would have a working out-put equivalent to 17,500 watts for five hours out of every 24. Under these conditions the all-day efficiency is 93.8 per cent.

Yours truly,

Signed. HARRIS J. RYAN.

Department of Electrical Engineers,
Sibley College, Cornell University.

R. H. THURSTON, *Director.*

September 9, 1892.

Budapest Electric Tramway.

The electric tramway in Budapest has now been working for more than three years. As overhead wires were not permitted, the underground conductor was necessarily employed. The boilers used at the generating station are of the water tube type. These are five in number and furnish power for three compound condensing engines of 100 horse-power each, driving, by means of ropes, one dynamo, while two 200 horse-power engines are each coupled directly to a dynamo. The current is furnished at a tension of 300 volts. The cars have two axles and a single motor.—*The Railway World, London.*

New York State Seizes a Telegraph Office.

Babylon, L. I., has been considerably stirred up over the actions of the State authorities in establishing quarantine landing places, etc., to prevent the spread of the cholera. Troops were sent down there as a precaution against any trouble on the part of the Babylonians. On the morning of September 14, Colonel Austin sent a telegram to Governor Flower informing him of the situation. He said there were no signs of any trouble. Everything was quiet and he did not consider affairs serious enough to warrant the keeping of so large a force of troops there. He also said that he would advise the detention of two companies, which would be equal to any emergency that might arise. Companies I and F, composed of 85 men, would be assigned to the duty if the Governor concurred with him. If necessary, he could call upon other companies, which would make the entire number 206, exclusive of the Colonel's staff and the non-commissioned officers. Colonel Austin anxiously awaited a reply to his communication. The two wires from Babylon were in bad working order, owing to a recent severe storm. The newspaper men had filed so much matter that the office was simply overwhelmed with business, and communications were accepted only subject to delay from four to six hours.

Colonel Austin asked the operator if his dispatch had been forwarded. He received a negative reply, and then informed the operator that his message must go ahead of everything. The telegrapher evidently did not realize the importance of the Colonel's position, and did not answer him.

"I demand that my message be sent this very minute," he said to the operator.

"I will get it off the very moment I can," retorted the man at the key.

"If you do not send it this instant I shall seize the wires in the name of the State Government," came the startling reply from the officer. "Will you do it now?" There was no answer.

The small office by this time was choked to the door by correspondents and loitering soldiers. It was the first exciting event of the day, and everybody was on the tiptoe of expectation.

"Captain Babcock," yelled the colonel, "summon a corporal's guard instantly."

Down the street to the Watson House rushed several troopers to obey the summons.

"Is there any one here who can telegraph?" inquired the colonel.

The United Press reporter, who can use the key and who is an old time press operator, told the colonel that his services were at the command of the colonel.

"I appoint you as my operator. Come in the office with me," he said. The correspondent forced his way through a small door, followed by Colonel Austin. The Western Union operator had by this time been cowed into submission by the assumption of the colonel's power, and began to send the message.

"See that every word is transmitted which my message contains," were the orders from the colonel to the correspondent. The message was sent word for word.

"Now, send another message to Governor Flower," was the command. It was to the effect that his message had been disgracefully delayed and that he had seized the Western Union office, and that he was waiting for orders from him.

During this scene a wagon containing a corporal's guard dashed up to the door and was ready for any action. The scene by this time was all over and the colonel retired from the office.

At a meeting of the stockholders of the Philadelphia Edison Electric Light Company, held last week, the original contract with the General Company was modified by a reduction of the royalty about 70 per cent, and the capital was increased by the addition of $1,000,000. The increase has become necessary on account of the demand, and it will enable the company to extend its business and to increase the plant.

ELECTRIC RAILWAY AND POWER NOTES.

Work is to be resumed on the electric street railway in Rome, Ga.

The electric road between Middletown and Steelton, Pa., is rapidly nearing completion.

The mountain resorts near Kobe, Japan, are to be connected to that town by an electric road.

Hamilton, Ont., is considering the cost of the electrical transmission of power from Niagara Falls.

The Meriden, Conn., street railway is to be equipped with electricity and is also to be extended to Wallingford.

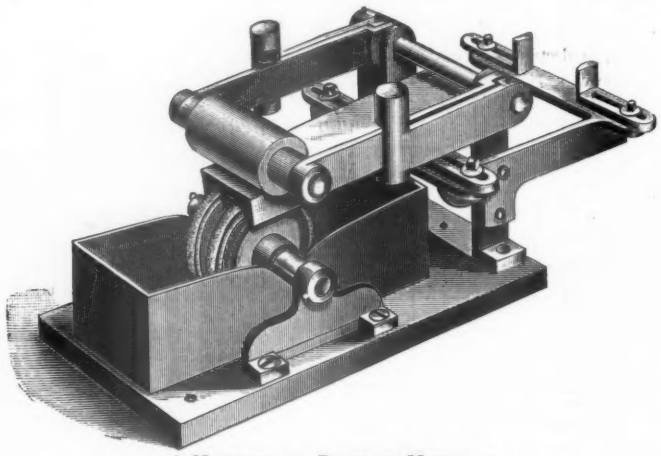
The Fond du Lac, Wis., electric railway is undergoing reconstruction and will be re-opened about November 1.

It is probable that the electric railway between Rockland and Brockton, Mass., will not be built before next spring.

It is said that the New Britain, Conn., Tramway Company has been purchased by parties who will equip it with electricity.

Electric exhaust fans are now employed by many of the billiard rooms abroad for the purpose of keeping the air in the rooms pure.

Trustee J. E. Walker is calling in the subscriptions for the purchase of land for the Hopedale, Mass., Electric Company's works.



A Machine for Painting Moulding.

The work on the trolley system at Chester, Pa., is progressing rapidly, and the resignation with which a property-owner sees a pole planted in front of another man's premises is one of the benignant sights of the times.

The new electric railroad between Sanford and Springvale, Me., will be a combination passenger and freight road. The equipment will consist of two passenger cars and an electric locomotive for handling freight cars. The primary power will be taken from water falls and will operate a 100 horse-power multipolar generator. Westinghouse apparatus will be used. It is expected that by October 25 this road will be in operation. It will be 2½ miles in length.

Electric power for manufacturing concerns may be had in Bath, Me., shortly. Last week ex-Mayor Patten put down $5,000 toward the purchase of a water power for this purpose, and it is believed that the remaining $20,000 needed will quickly follow. The plan is to buy the lower falls of the Androscoggin river, just above Brunswick, and generate electricity, to be carried to Bath, 14 miles away and there used to drive motors. The water privilege there is of 6,200 horse-power.

It is understood that the business men in the vicinity of Raritan, N. J., have a project in prospect, which, finished as contemplated, will be of immense benefit to all concerned. This is the building of an electric railroad from Raritan to New Brunswick over the Bound Brook turnpike and along the north side of the Raritan river. There will also be a branch road to Chimney Rock for summer purposes. The road will also include Somerville. The men who have the matter in charge will commence the work as soon as sufficient funds can be raised.

The formal consolidation of the Lincoln City Street Railway with the Capitol Heights Street Railway was effected at Lincoln, Neb., on September 14, by the reorganization of the company. Since the recent sale of the Lincoln city line, they have both been practically in the same hands. The new company is called the Home Street Railway and the capital stock is increased from $100,000 to $300,000. The new officers elected are: J. H. McMurtry, president; E. Finney, vice-president and general manager; K. K. Hayden, secretary and treasurer. The directors are J. H. McMurtry, E. Finney, E. E. Brown, J. J. Imhoff, H. L. Smith, of Geneva; K. K. Hayden. Several extensions and improvements are contemplated, though plans are not fully matured. The Randolph street line, on which service was recently abandoned, will be immediately equipped with electric power and operated as far as Thirtieth street, and probably before a great while to Fortieth street.

TELEPHONE CHAT.

Salem, Mass., is interested in the suits over the various police telephone systems.

The Erie Telephone Company's sub-companies made a net gain of 107 subscribers in August. Total connected September 1, 14,541.

The Omaha, Neb., Telephone Company has begun excavating for its $65,000 building at Eighteenth and Douglas streets.

Telephonic communication has been established between Lockport and Wilson, N. Y. This connects Lockport, Youngstown and Lewiston by telephone.

The telephone line between Rutland and West Rutland, Vt., is being taken down and a new one substituted. The line between Rutland and Burlington will be in working order in about a month.

The New England Telephone Company is to extend its lines from Bangor, Me., to Dexter *via* Six Mile Falls, Kenduskeag, East Corinth and Garland, and will then make a circuit of West Penobscot and Piscataquis county, extending to Dover and other places. This line will prove a great convenience, and will, without doubt, be appreciated by the citizens of Dexter and the places which it reaches.

Richard A. Brown, manager of the Sunset Telephone Company, has shown his appreciation of the newspaper fraternity by putting a telephone box in the reporters' gallery at the race track. His courtesy is praised by the pencil pushers. Heretofore it was necessary to send a messenger to work the growler. Now the base of supplies may be reached by telephone—a saving of time and money. Besides, it is a great convenience in every way.—*Sacramento, Cal., News.*

A Machine for Painting Moulding.

Many of our electricians have "risen from the ranks," and these are all familiar with the bugbear of "painting moulding." How many hours have you spent with a brush, a pot of "P. & B." paint and a carload, more or less, of moulding that had to be painted? And at night, when your wrists were throbbing with a day's aches and pains from pushing that brush for miles up and down the moulding, how glad you were to get to that can of kerosene to soak the paint off your hands and arms and out of your hair!

All this is now in a fair way to be changed, and by the same men who make "P. & B." paint. The Standard Paint Company, 2 Liberty street, New York, have designed and are manufacturing a machine for painting moulding. It is illustrated on this page. As almost all moulding for inside wiring is now required to be painted with a water-proof compound, it will be to the advantage of those who have this work to do to use such a machine. It will be a great saving in labor, and also a considerable economy in the use of the paint or compound. This painting machine is very simple. It can be so arranged that any size moulding can be painted by it. Any one can handle it, and two boys can easily paint 1,000 feet of ordinary size moulding inside, outside and back of capping within an hour.

The machine does its work thoroughly. It does not take up any room to speak of, is strongly built and will recommend itself to any one. They are already much used in connection with the "P. & B." water and acid-proof compound, and are giving very great satisfaction.

Insullac.

It is a noticeable fact that the progress of practical electrical science has been so rapid that the allied chemical and mechanical arts have failed to keep the pace.

Especially has this been apparent in the case of insulating compounds, shellac being the only practical agent for effective work in coil and armature winding, and in the multitudinous applications where insulation resistance and water proofing is required.

The following quotation is a volume in itself: "At the present day it is very difficult to buy really good shellac, the material of commerce being very much adulterated."—Professor Ayrton in *Practical Electricity*.

The fact that shellac is manufactured abroad readily explains this condition of affairs, which is still further complicated by the adulterations of the dealers.

Shellac cut in grain alcohol is much superior in resistance to a solution in wood alcohol—a fact which is familiar to all electrical experts.

Some months ago the Massachusetts Chemical Company, of Boston, called the attention of their chemists to this state of affairs, believing that it should be possible to produce a varnish, which could be marketed at a lower price than shellac and at the same time be of uniform quality and high resistance.

That their efforts have been successful in a very great degree is demonstrated by the production of an alcohol varnish of an insulation resistance nearly four times greater than that of the best grain alcohol shellacs.

The Massachusetts Electrical Engineering Company is the authority by which this superiority is established. This varnish is aptly named "Insullac."

It is of a beautiful transparent amber color, but to suit the public taste the manufacturers will produce it in any desired color. Its appearance when applied, method of application and rapid drying qualities are identical with those of shellac, whose place in electrical work it will entirely supersede.

Professor Babcock, the well-known Boston chemical expert and assayer, reports that a careful analysis of the new compound shows no traces of any acids injurious to any materials to which it may be applied, or any constituent in any way injurious to the health of workmen.

The fact that "Insullac" is placed upon the market at a lower price than the poorest shellacs, should at once attract the attention of all users of shellacs for electrical purposes.

ADVANCE INFORMATION.

New Electric Companies Formed and Important Constructions Projected.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week:

New Electric Railways.

HAZLETON, PA.—The Hazleton and North Side Electric Railway Company; capital, $75,000; to run from Hazleton through Harleigh, Ebervale, Oakdale, Japan, Drifton and Freeland. The directors are, Alvin Markle, president; C. W. Kline, N. C. Yost, Hazleton; A. P. Blakslee, Delano, Pa., and P. J. Ferguson, Shenandoah. The Hazleton and South Side Electric Railway Company; capital, $75,000; to run through Spring Mountain, Andenreid, Jeanesville, Hazleton, Stockton and Beaver Brook. Directors are the same as for the Hazleton and North Side Railway.

DENVER, COLO.—The Highland Avenue Electric Railway Company is being formed to build an electric line to Golden.

CHICAGO, ILL.—Articles of incorporation of the Chicago and Southwestern Electric Railway Company, capital, $250,000, have been filed. It is proposed to build an electric railway in Cook county. The incorporators are, F. S. Collier, Geo. W. Warr, O. L. Baskin, Henry R. Baldwin and M. D. Byers, all of Chicago.

KINGSTON, CAN.—The Street Railway Company offers the city, should it be allowed to use electricity, three per cent. when the gross earnings reach $30,000, and one per cent. for every $10,000 additional.

HOUTZDALE, PA.—The Philadelphia and Houtzdale Passenger Railway Company has been chartered to build a 10 mile street railway between the points named in its title. Capital, $100,000.

CLEARFIELD, PA.—The Clearfield and Curnensville Passenger Railway Company; capital, $100,000; to run between the above towns, seven miles.

BOYERTOWN, PA.—There is a project on foot to build an electric road from Boyertown to Ringing Hill and thence to Pottstown. A committee has been appointed to solicit subscriptions from the citizens along the route.

WORCESTER, MASS. — The Consolidated Railway Company has voted to operate the Quinsigamond line with electricity.

RARITAN, N. J.—Prominent business men are again active in the revival of a scheme to build an electric railway to Bound Brook and thence to New Brunswick, a total distance of 12 miles.

HUNTINGTON, IND.—The Huntington Street Railway Company, Dr. Geo. H. McLin, president, will build a street railway this fall, if a franchise is granted by council. The capital stock, $100,000, has been taken by Huntington men.

YORK, PA.—The York Street Railway Company has been granted permission to change its motive power to the electric trolley system.

ST. LOUIS, MO.—F. W. Mott is trying to organize a company to build an electric road from Carondelet to Jefferson Barracks. Power will be furnished by the Carondelet Electric Light Company.

DETROIT, MICH.—The Detroit and Suburban Street Railway Company has made a contract with the Westinghouse Manufacturing & Electrical Company, of Pittsburgh, for the equipment of its road with an electrical system.

BRIGANTINE BEACH, N. J.—Application has been made to the city council for a franchise for an electric railway.

EASTON, PA.—The Easton Horse Car Railway Company has sold out to a syndicate of capitalists, which has formed the Easton Transit Company, with Warren Wilber as president and A. D. Chidsey as secretary. The road-bed on the various streets is being re-laid, and the line extended in all directions. The company is capitalized at $300,000.

LYKENS, PA.—The Williams Valley Electric Railway Company, chartered nearly two years ago to extend from Lykens to Tower City, will probably construct its line as far as Williamstown this fall.

BRAINERD, MINN.—The electric street railway franchise recently granted to H. Spalding has been acquired by C. N. Parker, of St. Paul, who will construct four miles of track.

LINCOLN, NEB.—The Home Street Railway Company, J. H. McMurtry, president, K. K. Hayden, secretary, capital, $300,000, is a consolidation of the Lincoln Street Railway and the Capital Heights line. The Capital Heights line will be equipped electrically.

HORNELLSVILLE, N. Y.—The Hornellsville Electric Railroad is to be extended five miles to Canisteo, at an estimated cost of $50,000.

COLUMBIA, S. C.—The Columbia Street Railway, Light and Power Company has been granted permission to use electric motors on its old horse car line.

BROCKTON, MASS.—A charter has been granted to the Brockton and Holbrook Street Railway Company; capital, $70,000. Directors, Geo. H. Campbell and Alfred A. Glassie.

SPRINGFIELD, ILL.—Articles of incorporation of the Chicago and Southwestern Electric Railway Company have been filed in the office of the Secretary of State. The office of the company is in Chicago, and the capital is $250,000. It is proposed to build a railway in Cook county, running east and west, from and between the southwest corner of section 4, in township 37 north, range 14 east of the third principal meridian and the northwest corner of section 9, in township 37 north, range 13 east of the third principal meridian. The incorporators are George W. Warr, Fred. S. Collier, O. L. Baskin, M. D. Byers and Henry R. Baldwin, all of Chicago. The first board of directors is B. F. Jacobs, O. K. Manson, Frank M. Clement, E. P. Crocker, D. R. Niver, Richard S. Thain and T. P. Nisbett.

New Manufacturing Companies.

ROCKLAND, ME.—The Highland Electric Company; capital stock, $500,000. President, Hanson Gregory, Jr.; treasurer, John G. Robinson, Boston, Mass.

BOSTON, MASS.—The American Company, capital stock, $750,000, has been incorporated to manufacture machinery, rails, dynamos and electrical appliances. Wm. T. Ellis, of Brookline, Mass., is treasurer.

CHICAGO, ILL.—The Kimball Electric Company, capital stock $5,000,000, has been chartered by Chas. H. Tallmadge, A. L. Allen and W. R. Payne. The company will control patents on devices intended to make practical the carriage and use of electricity for car motors in underground conduits.

MONTREAL, CAN.—A number of Montrealers are seeking incorporation as the Central Electric Company, with a capital stock of $200,000.

CHICAGO, ILL.—The Ravenswood Electric Company; capital stock, $10,000. Incorporators, Preston W. Gray, H. O. Mackenzie and John T. Parker.

HAMMOND, IND.—The United States Cold Wire Rolling Company will locate here and will begin building early next month. It will manufacture cold rolled copper wire by a process brought out by Henry Williams, of Boston. The company is composed of Chicago capitalists and has a capital stock of $500,000. The plant and machinery will cost nearly $1,500,000. One of the projectors said yesterday that the company had open contracts with the Bell Telephone Company for $5,000,000 worth of their product per year.

SAN FRANCISCO, CAL.—The American Development and Manufacturing Company has incorporated. Capital, $6,500,000. Directors, G. W. Osborn, H. S. Herrick, Henry Thompson, Ed. Ewald, G. W. Osborn, Jr. The Gardiner General Electric Company has been incorporated. Capital, $750,000. Directors, Robert N. Graves, W. P. Wilder, Joseph B. Gardiner, W. A. M. Van Bokkelen, Jacob Stadtfeld, Jr.

NASHVILLE, TENN.—The charter of the Illinois Electrical Signal Company, the object of which is to manufacture and sell electrical machines, has been registered in the County Register's office. It is a New York company and the incorporators are G. A. Drake, E. W. Powers, Andrew Dam, H. T. Davis and George Cowen.

SALT LAKE CITY, UTAH.—Articles of incorporation of the Electrical Manufacturing Company have been filed in the office of the County Clerk. The principal offices of the company are in this city. The life of the company is for 50 years. The object of the incorporation is the manufacturing of electrical instruments, apparatus, etc., and general repairing of electrical apparatus. The amount of the capital stock of the company is $5,000, divided into 1,000 shares of five dollars each, of which 800 shares are subscribed as follows: W. J. Moorhead, 200 shares; F. C. Priestly, 200; J. W. Clark, 200; James Moffat, 100; J. Kempf, Jr., 100; F. C. Priestly is President; W. J. Moorhead, vice-president; James Moffat, secretary and treasurer, who, with J. W. Clark and J. Kempf, form the board of directors.

Telephone and Telegraph Companies.

ADDISON, W. VA.—The Addison Telephone Company; capital stock, $800, with privilege to increase to $10,000, has been incorporated by C. P. Door, H. C. Thurmond, L. A. Armontrout, Richard Shelton, of Addison, and A. S. McClung, of Charleston, W. Va.

BANGOR, ME.—The New England Telephone Company is to extend its lines from Bangor to Dexter.

GALESBURG, ILL.—The Galesburg telephone system is to be reconstructed at a cost of $12,000.

Electric Light and Power.

BATH, ME.—Electric power for manufacturing concerns may be had in Bath shortly. The plan is to be by the lower falls of the Androscoggin River, just above Brunswick, and generate electricity to be carried to Bath, 14 miles away, and there used to drive motors. The water privilege is of 6,200 horse-power.

WASHINGTON, D. C.—L. N. Cox, of this city, is negotiating with the authorities of Norfolk, Va., for the establishment of an electric light plant.

CUMBERLAND, MD.—The Economic Electric Light & Power Company has been granted a franchise for an electric light plant.

SAN FRANCISCO, CAL.—Gardiner General Electric Company; capital, $750,000. Promoters, Robert N. Graves, W. P. Wilder, Jacob Stadtfeld, Jr., of San Francisco; Wm. A. M. Van Bokkelen, Oakland, Cal.; Joseph B. Gardiner, of Nyack, N. Y.

BUCKLEY, WASH.—Buckley Electrical Company; capital, $12,000. Promoters, Eugene Van Alstine, Wm. Fettig.

HAVERHILL, MASS.—The citizens will vote on the question of establishing a municipal gas and electric light plant.

DARLINGTON, S. C.—The Darlington Light and Power Company; capital, $10,000. E. K. Dargen, principal stockholder.

WESTPORT, MO.—R. J. Mackay, of Cincinnati, is an applicant for a 15-year franchise for an electric light plant.

PINCKNEYVILLE, ILL.—Pinckneyville Electric Light Company; capital, $2,250. Promoters, H. P. Huntsinger, M. Teagen, Thos. S. Campbell, W. D. Ward. Incorporation papers sent to Charles W. Roe, Pinckneyville, Ill.

PORT ANGELES, WASH.—Western Washington Development Company; capital, $300,000. Promoters, B. F. Schwartz, J. S. Coalican, Norman R. Smith, Chas. Gove.

GREEN ISLAND, N. Y.—The Green Island Electric Light Company; capital stock, $25,000. Directors, Knight Neftel, of Jersey City; Chas. W. Marsh, Chas. E. Barrett and Wm. E. Laragh, of New York city.

JIMTOWN, COLO.—The Amethyst Electric Power and Light Company has been granted permission to erect poles and wires for an electric light system.

MILFORD, MASS.—The Milford Electric Light Company, will increase the capacity of its plant.

COOPERSTOWN, N. Y.—Cooperstown Electric Company; capital, $12,500. Promoters, Oliver R. Butte, of Cooperstown, and Robt. E. Drake and Paul T. Brady, of Syracuse, N. Y.

ST. PAUL, MINN.—Butte General Electric Company; capital, $600,000. Promoters, H. M. Byllesby, H. C. Levis, of St. Paul, and J. R. Wharton, Butte, Mont.

Light the Streets.

The streets of few cities are so badly lighted as those of New York.

Broadway and Grand street are two of the most brilliantly lighted thoroughfares in the world, thanks to the magnificent shops, hotels and other business establishments that line their pavements. These two streets are the only well lighted ones in New York.

Even Sixth and Third avenues are dark in spots, and Fifth avenue, with its widely scattering lights, might easily be mistaken for some subterranean passage by an unfortunate aeronaut happening to drop upon its pavement. Through the efforts of the City Improvement Society this latter street will be brilliantly illuminated in a few months. Requests for bids have already been sent out by the authorities, and by January 1 the handsomest street in the metropolis will more nearly resemble a modern thoroughfare than one of Dante's dungeons.

The City Improvement Society, we learn, is also endeavoring to secure proper lighting for all streets. The efforts of the Society in this direction are deserving of the warmest encouragement.

Why cannot New York be as well lighted as Brussels, Paris or Washington?—*New York Telegram.*

Last Saturday a fire was discovered in the station of the Municipal Electric Light Company, at Rodney and Ainslie streets, Brooklyn. The company's fire department extinguished it. Loss about $25.

KINDRED INTERESTS

The Western Electric Company, Chicago, is sending out a pocket edition of its very handsome illustrated general catalogue for August, 1892.

The Fort Wayne Electric Company is adding a two story frame wareroom to its plant at Fort Wayne, Ind. The structure will be 50 x 150 feet and will cost $6,000.

The Detroit Electrical Works are said to be pushed with business at the present time. They are employing a large force and running their factory to its fullest capacity.

The Kerite Company's plant at Seymour, Conn., is to be enlarged by a brick addition 43x120 feet. It will be lighted by skylights as well as side windows. Mr. Brixey is also having a new 15 ton hydraulic crane put in, from the Farrell Foundry and Machine Company's works, in Ansonia.

Mr. John A. Blattau, special traveler for the Ries Electric Specialty Company, of Baltimore, Md., says the Ries regulating socket is making thousands of new consumers for the central stations, and that enterprising construction companies are reaping a harvest, particularly in wiring residences with this device.

Queen & Company, of Philadelphia, report steadily increasing sales of their "Magnetic Vane" ammeters and voltmeters, which instruments meet with much favor for switchboard use. They have now been on the market long enough to show real "staying" qualities, and combine handsome appearance with accuracy and moderate prices. An entire absence of permanent magnets and other changeable parts renders them constant in indication, so that recalibration is unnecessary, unless required mechanically. Four manufacturing concerns have adopted these instruments and install with both light and power plants, while numerous others use them to a considerable extent. The Queen factory is taxed to its utmost capacity and every effort is being made to keep up with the demand. Descriptive circular No. 330 will be mailed by them upon request.

Dixon's Graphite. — The Joseph Dixon Crucible Company, Jersey City, N.J., have sent us a very interesting pamphlet called "Dixon's Perfected Graphite for Lubricating." They write about the book as follows: "Engineers and others who have been fortunate enough to obtain pure, soft flake graphite, properly prepared, do not question its value as a lubricant. On the the contrary, they make daily use of it in many ways and recommend it in the strongest terms. Those who have desired to test the virtues of graphite and the claims of its advocates, and who have been unfortunate enough to obtain only impure and gritty graphite naturally condemn its use. It is for the better understanding of our mechanical friends that we have prepared and published the pamphlet herewith which we commend to your attention. We have endeavored to state clearly its value and some of the uses of pure flake graphite as a lubricant, and the reason why some experiments with the ordinary commercial graphite resulted in such poor success."

Can Any One Explain Why This is Thusly?

A fair example of how the correct names of certain lines of goods become tampered with by the trade, and eventually lose their original names as intended by the inventors or manufacturers, simply through the carelessness of some dealers who could just as easily call the article by its correct name, as to manufacture a name to suit themselves. We all know that this is being done, but why or wherefore we cannot explain. For example, the well known "Ries Regulating Socket" which is so well advertised and spoken of, has already had the following different styles of names attached to it by parties ordering, and the company have on file hundreds of letters in which their regulating sockets are ordered. In most instances the article is called by any other name but the right one, in spite of all the printed matter which has been issued. Here are some samples: Reaction sockets, reduction sockets, regulate sockets, dimmer sockets, kicking coil sockets, turn-down sockets, economy sockets, regulable sockets, alternating sockets, controlling sockets, graduating sockets, step-up sockets, new era sockets, stateroom sockets, hotel sockets, cut-off sockets, residence sockets, Reese sockets, new kind of sockets, missing link sockets, Ries electric socket, just like gas jet socket, Ries perfection sockets, and Heaven only knows what else is yet to come. The correct name is the Ries regulating socket.

G. E. HORN & CO.,
Manufacturers and Jobbers of
ELECTRIC BELLS,
63 So. Canal St., Chicago, Ill., U. S. A.
SHALL WE SEND YOU OUR ILLUSTRATED PRICE LIST?

THE
BEACON VACUUM PUMP AND ELECTRICAL CO.
have instituted proceedings for infringements of their patents on Metallic Vacuum Pumps against Berrenberg Bros. of Boston.

ELECTRICAL MEASUREMENT
Instruments and Batteries of the Very Highest Grade.
Precision and Constancy, Quality and Finish the Best in the World.
Catalogue of Standard Test Instruments furnished upon application.
THE E. S. GREELEY & CO.,
5 AND 7 DEY ST., NEW YORK.

Hilbert Fence & Wire Co. St. Louis, Mo.
Artistic Metal Workers.
Brass, Iron and Wire Office-work. Railings, Crestings, Nettings, etc. Everlasting Cemetery FENCES. Shipped everywhere. Agents wanted. Write for Catalogue and Estimate.

IF YOU have anything pertaining to electric machinery you want to sell, send us the description.
IF YOU want anything pertaining to electric machinery, send us your inquiries.
FRANK RIDLON & CO.,
Dealers in New and Second-Hand
Electric Light & Power Machinery,
196 SUMMER STREET, BOSTON.

THE DANDY BELL.
Best Bell, pressed metal gong, long phosphor bronze springs and platinum contact points. Most reliable bell in the market. In four sizes, 2½ inches, 3 inches, 3½ inches and 4 inches. Samples sent post-paid to all dealers upon receipt of 50 cents and business card.
THE TIME ELECTRIC CO.,
C. O. BARTLETT, Gen. Manager,
CLEVELAND, O.

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